TRANSACTIONS

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SEPTEMBER - OCTOBER
1961

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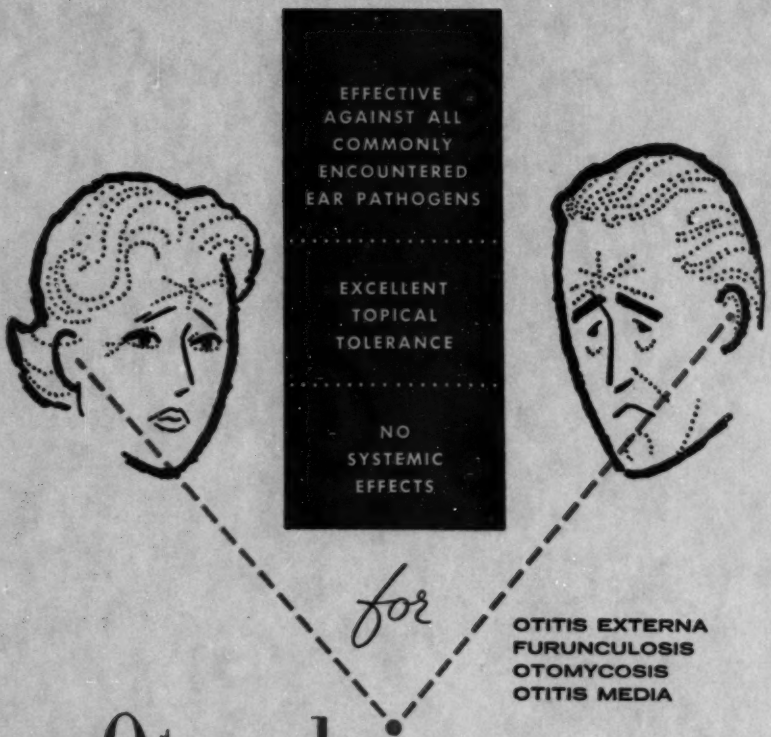

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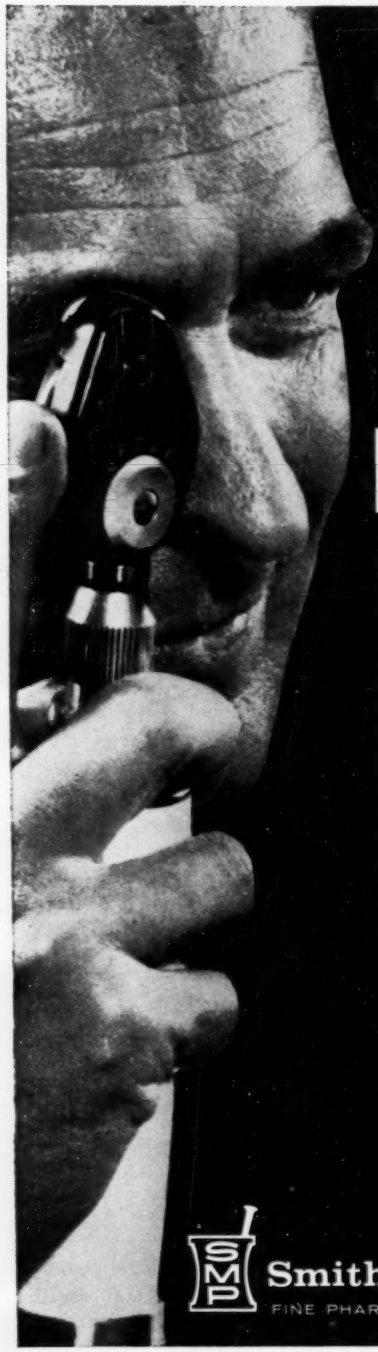

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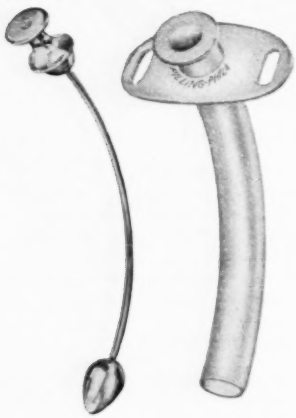

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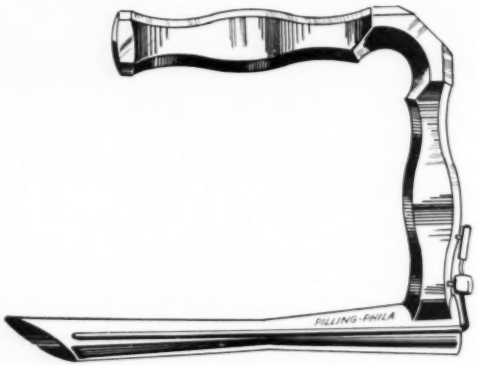

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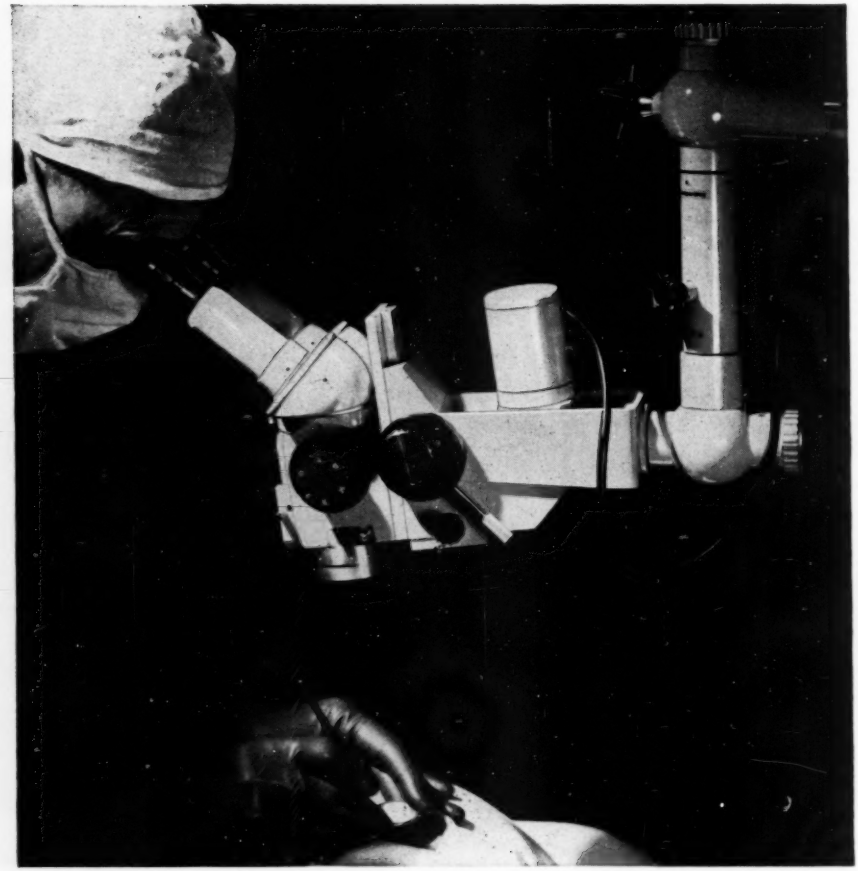

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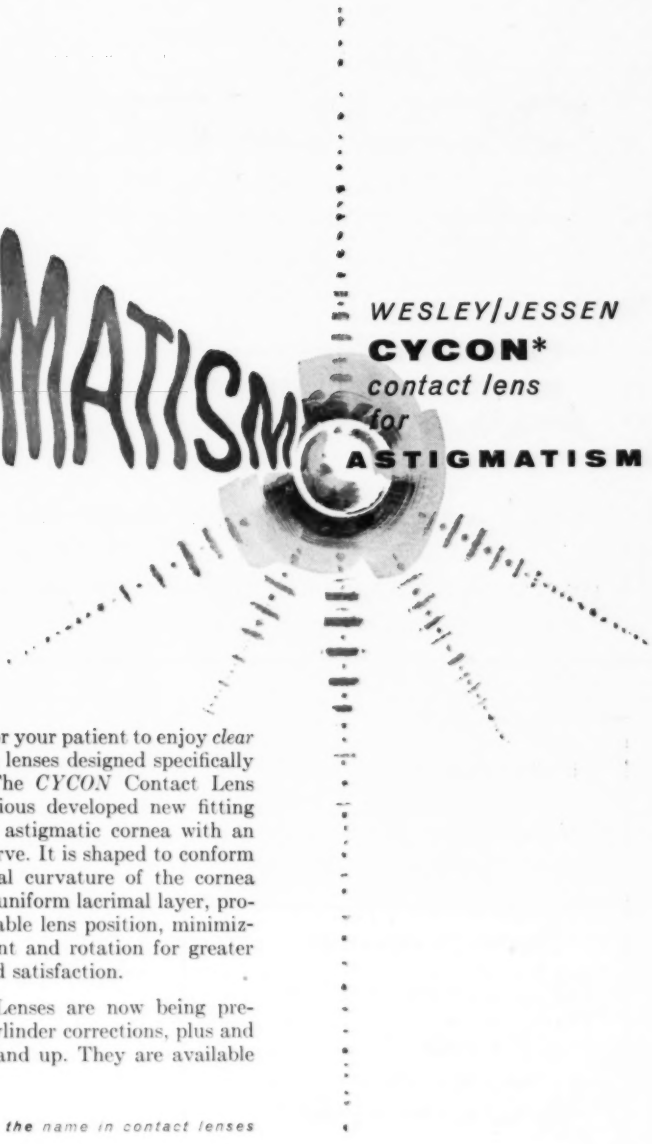

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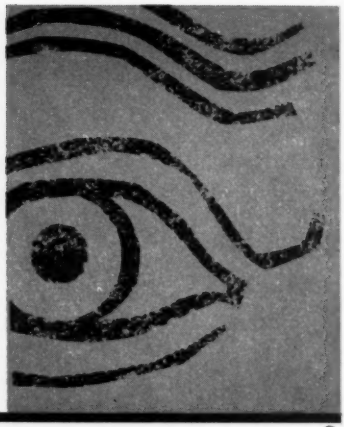

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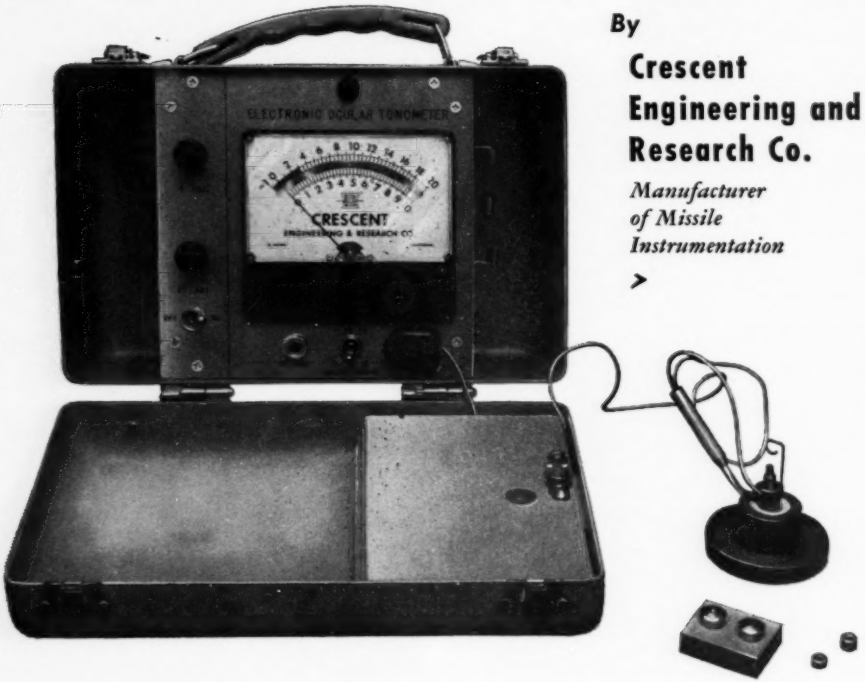

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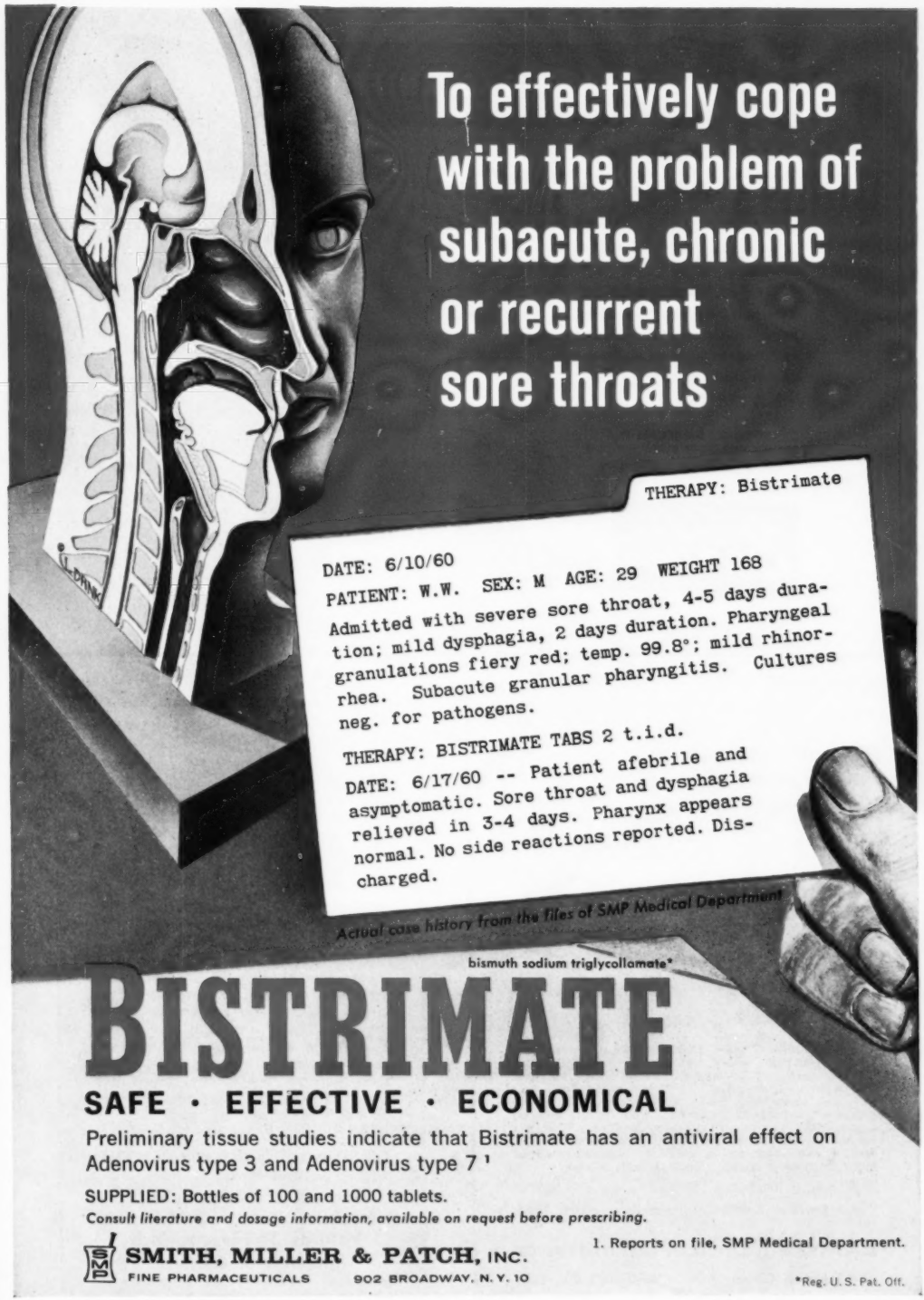
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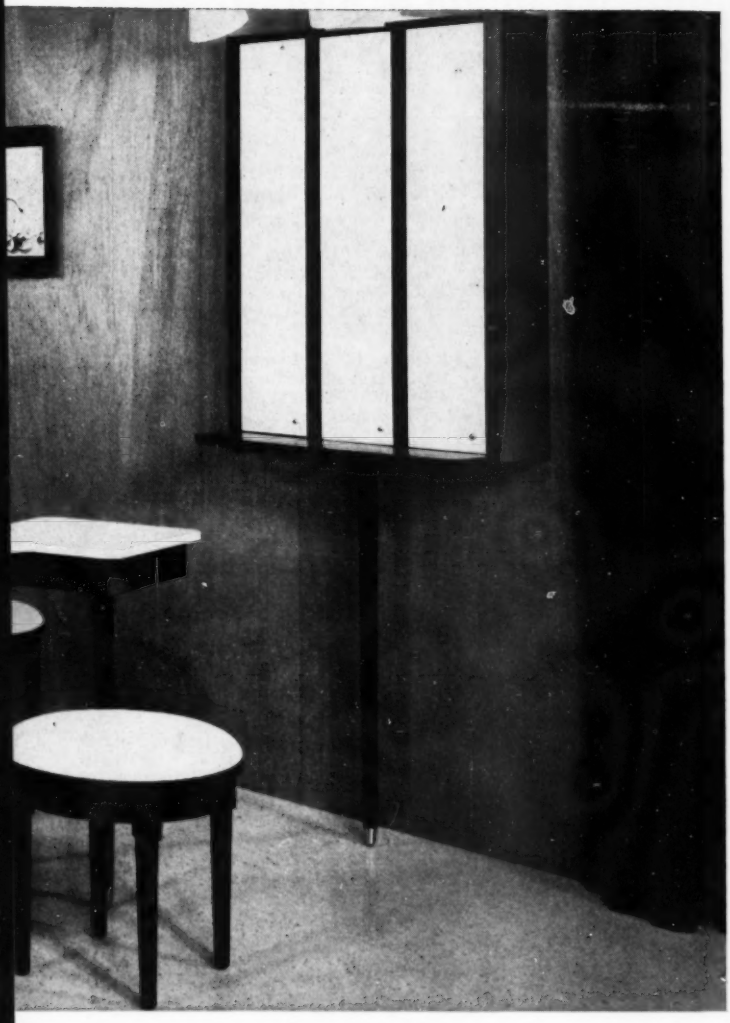

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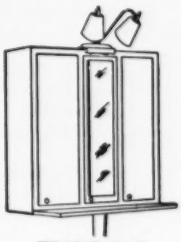

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1. Abrahamson, I. A., Jr. & Abrahamson, I. A., Sr., *Am. J. Ophth.* (Insert vol.:page), 1956.
2. Feinblatt, T. M., Feinblatt, H. M. & Ferguson, E. A., *Am. J. Digest. Dis.* 22:5, 1955.
3. Feinblatt, T. M., Feinblatt, H. M. & Ferguson, E. A., *Med. Times*, 84:741, 1956.

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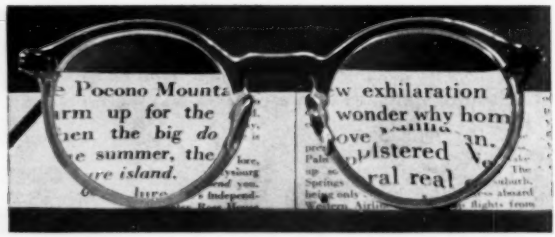

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NECROSIS OF THE IRIS, CILIARY BODY, LENS AND RETINA FOLLOWING SCLERAL BUCKLING OPERATIONS WITH CIRCLING POLYETHYLENE TUBES

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IN 1957, Schepens, Okamura and Brockhurst published the first[7] of a series of articles on the scleral buckling procedures.[1,6-8] Basically, the operations consist in closing or walling off the retinal breaks with diathermy and then indenting the treated area towards the vitreous cavity by means of a polyethylene foreign body embedded in the sclera. Of the newer procedures, the scleral buckling operation with a circling polyethylene tube is the one most frequently used, and it has achieved considerable popularity throughout the country.

The purpose of this paper is to describe an important complication that occurs after this type of retinal detachment surgery, but one that we do not believe is restricted to this operation. We have received two eyes at the Armed Forces Institute of Pathology in which the use of extensive diathermy in combination with a circling polyethylene tube has resulted in extensive tissue damage. In one of the cases (case 1), a scleral buckling with circling polyethylene tube was performed without a lamellar scleral resection. In the other case (case 2), a lamellar scleral resection was performed in conjunction with the scleral buckling. We have also received representative sections of another eye from an unpublished case (case 3) presented by Kirk[3] at the first meeting of the Midwestern Ophthalmic Pathology Club.

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CASE REPORTS

Case 1

A 63-year-old white man had first seen "halos," described as rings of colored light between him and the light source, in July 1958. At that time he was examined by an ophthalmologist, who found his intraocular pressure to be normal. The halos persisted, and on March 13, 1959, he noted lightning flashes and distorted vision in his left eye. On March 17, 1959, his local ophthalmologist made a diagnosis of retinal detachment in the left eye and referred the patient to another ophthalmologist for further treatment.

On examination March 23, 1959, visual acuity (corrected with —12.00 and —12.75 diopter spheres in the right and left eye, respectively) was 20/200 in both eyes. Pinhole examination improved the visual acuity in the right eye to 20/70-1 but failed to improve the visual acuity in the left eye. The intraocular pressure was normal. External examination revealed an esotropia of 20 prism diopters and an ocular nystagmus. Slit-lamp examination showed mild sclerosis of the lens

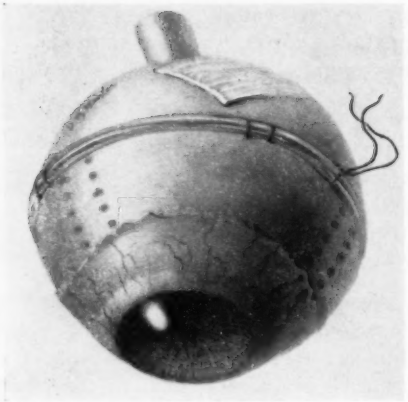


FIG. 1—Case 1. The eye at the time of surgery. The polyethylene tube is held in place by stay sutures over the sites where diathermy was applied. (AFIP Neg. No. 60-5336.)

and severe degeneration of the vitreous in both eyes, but no vitreous detachments were seen. Ophthalmoscopic examination revealed degenerative changes related to the myopia in both eyes, and retinal detachment extending clockwise from 3 o'clock to 10:30 o'clock in the left eye. The detachment extended posteriorly to the nerve and included the macula.

FIG. 3—Case 1. The anterior chamber is shallow, and a thin pupillary membrane is present. The cataractous lens is intumescent. Anterior to the "tube" (T) the retina is necrotic, and the choroid is edematous. The retina posterior to the tube is detached but appears viable. (Hematoxylin and eosin; × 4) (AFIP Neg. No. 60-3934) In this photomicrograph and others that follow, the tube has fallen out during preparation of the sections, and only the space previously occupied by the tube (T) remains.

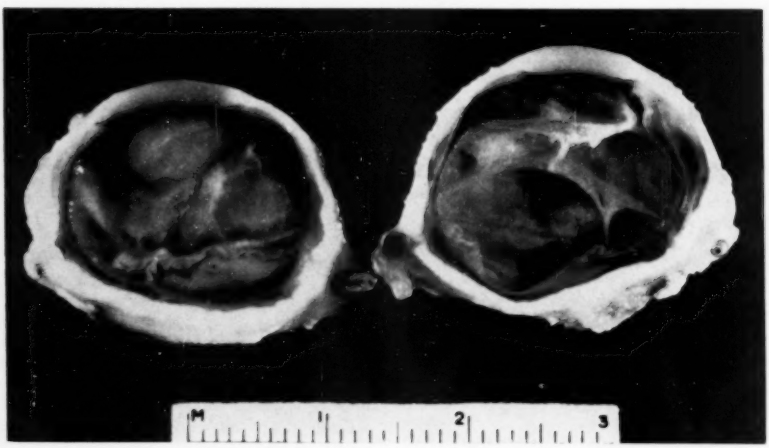


FIG. 2—Case 1. Superior and inferior calottes. The episcleral tissues surrounding the tube are thickened and scarred. The retina posterior to the tube (lower half of field) appears viable, and several vitreous bands are adherent to the scarred retina anterior to the tube. There is also thickening of the choroid anterior to the tube. (AFIP Neg. No. 59-7363-4.)

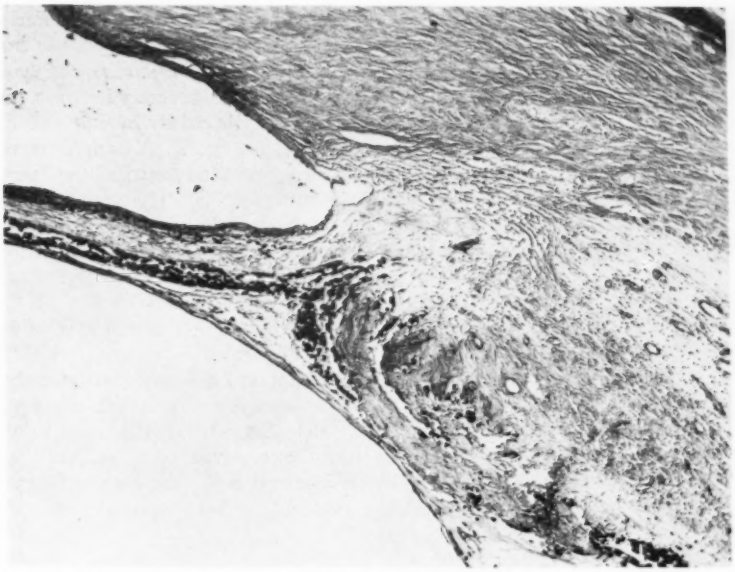


FIG. 4—Case 1. The iris on the nasal side is necrotic and partially replaced by hyaline and fibrous scar tissue. Schlemm's canal is patent, but the trabecular meshwork is occluded by a peripheral anterior synechia. (Hematoxylin and eosin; × 50) (AFIP Neg. No. 60-4551)

There were two retinal holes posterior to the equator at 6:30 o'clock and also two small slitlike tears 1.5 disc diameters from the nerve at 9:30 o'clock.

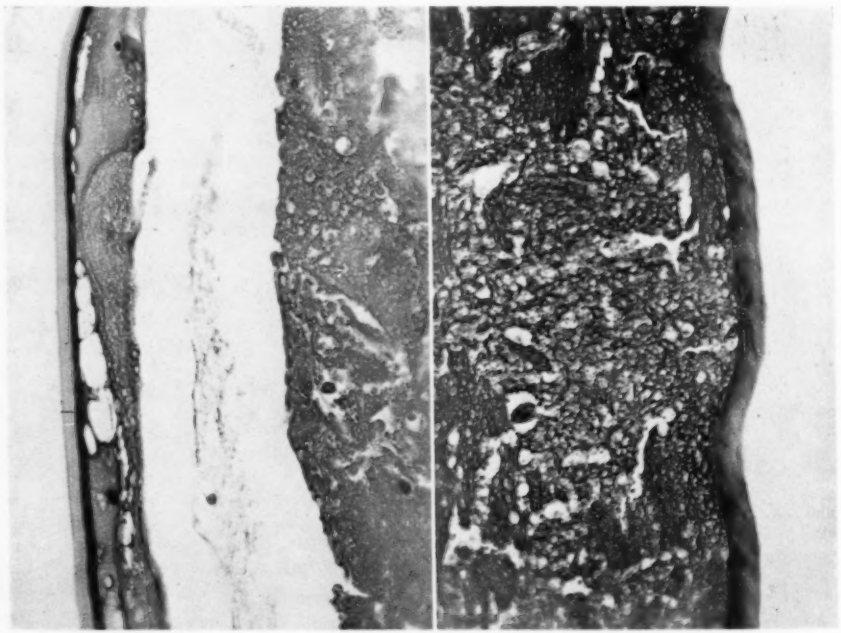
After three days of occlusion and bed rest there was no settling of the retina, and on March 26, 1959, a diathermy operation with circling polyethylene tube was performed. The medial and inferior recti were detached. Since the globe was large and the sclera very thin, the surgeon did not feel that it was possible to perform any scleral surgery. Diathermy was applied to the region of the holes with a 0.5 mm. electrode, and a double row of surface diathermy just posterior to the equator was carried clockwise from 2 o'clock to 10:30 o'clock and extended to the ora serrata at both ends. A polyethylene tube was carried around the eye and anchored by four stay sutures so that it lay over the line of diathermy running around the eye from 2 to 10:30 o'clock (fig. 1). Immediately following a sclerotomy with a release of a large amount of fluid, there was a choroidal detachment or hemorrhage in the upper temporal quadrant. The black silk suture in the tube was tied, with the knot placed at 1:30 o'clock. Since the area of the two holes near the optic nerve was not in contact with the choroid, a 1.0 mm. electrode without current was used to penetrate the sclera in this area. After a few drops of fluid escaped, the retina was then in contact with the choroid.

Postoperatively, intraocular hemorrhage became worse, and secondary glaucoma ensued. At the time of discharge, only a black fundus reflex was seen. On May 8, 1959, the eye was injected, tension measured 4.9 mm. Hg (Schiøtz), the anterior chamber was extremely shallow, and there was a mature cataract, which prevented examination of the fundus. The eye remained hypotensive, there was progressive atrophy of the globe, and enucleation was performed on June 30, 1959.

On gross examination the eye was slightly smaller than normal and was flattened in its anteroposterior diameter (21 mm.). Horizontal and vertical diameters measured 23 mm. A circling polyethylene tube extended around the eye 15 mm. behind the limbus (fig. 2).

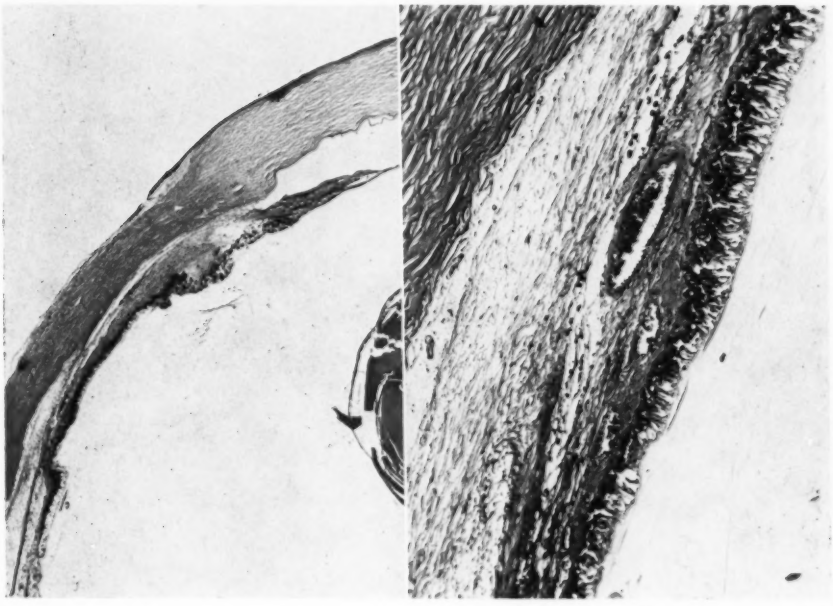
The episcleral tissues surrounding the tube were thickened and scarred. The eye was opened in the horizontal plane. The lens was large (fig. 3), and the iris-lens diaphragm was displaced anteriorly. The retina posterior to the tube appeared wrinkled. Anterior to the tube the choroid was thickened, and several vitreous bands were adherent to the scarred and necrotic retina.

Microscopic examination revealed irregular thinning of the corneal epithelium and the formation of several small bullae. In one peripheral area, Bowman's membrane was partially calcified. The peripheral corneal stroma was vascularized. The endothelium was severely degenerated. The anterior chamber was extremely shallow and contained some degenerating erythrocytes. Peripheral anterior synechias occluded the trabecular meshwork. The iris, especially on the nasal side, was severely necrotic and was partially replaced by hyaline and fibrous scar tissue (fig. 4). A thin, fibrous membrane extended across the pupillary aperture (fig. 3). The large intumescent lens revealed advanced cortical and nuclear degeneration. The anterior and equatorial epithelium on the nasal side was completely necrotic (fig. 5). Only a thin layer of equatorial epithelium on the temporal side remained viable. On the temporal side, the ciliary body contained only a few small areas of necrosis (fig. 6). On the nasal side there was extensive necrosis and partial hyalinization of the entire ciliary body (fig. 7). There was a mild, diffuse



A B

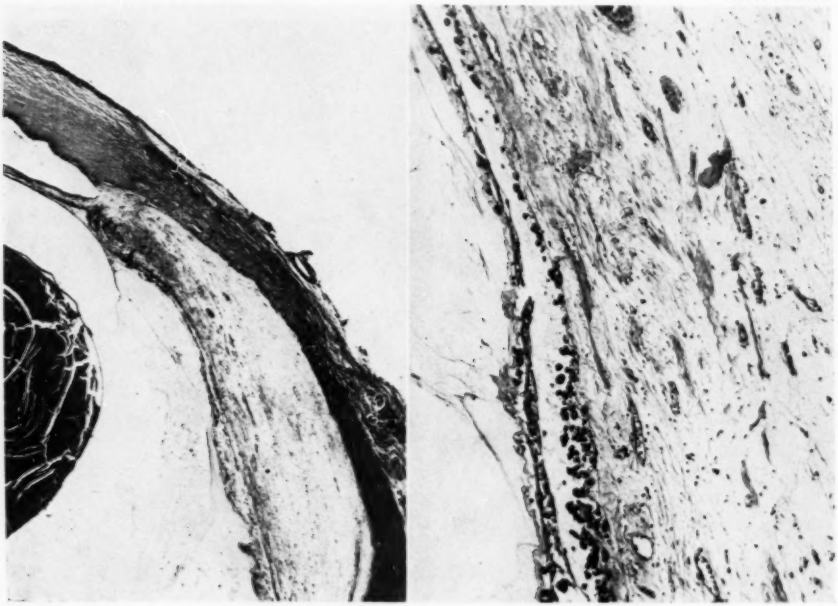
FIG. 5—Case 1. The equatorial epithelium on the nasal side (B) is completely necrotic. On the temporal side (A) a thin layer of viable epithelium remains. (Hematoxylin and eosin; × 305) (A, AFIP Neg. No. 60-4552; B, 60-4553)



A B

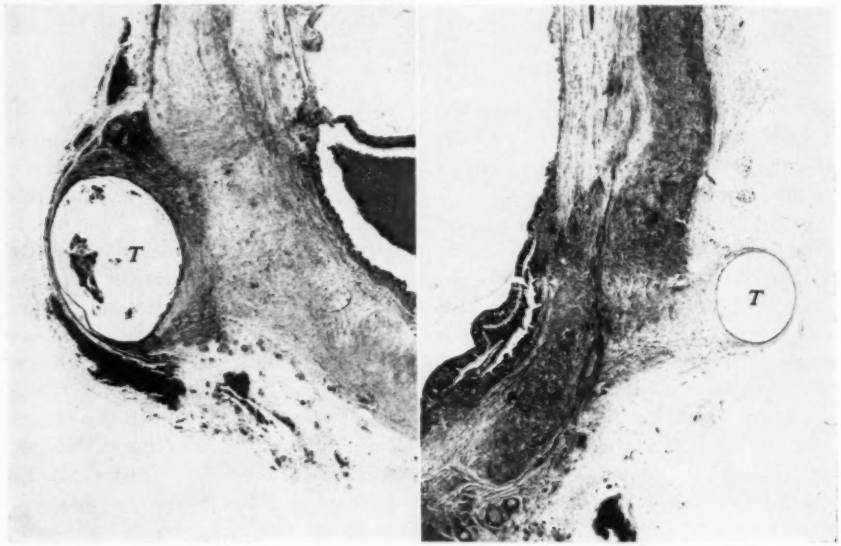
FIG. 6—Case 1. (A) On the temporal side the ciliary body contains only small areas of necrosis. (B) The ciliary epithelium overlying the pars plana ciliaris is viable. (Hematoxylin and eosin; A, ×12; B, × 80) (A, AFIP Neg. No. 59-7190; B, 60-3932-2)

mononuclear infiltration throughout the choroid. Posterior to the polyethylene tube the pigment epithelium and Bruch's membrane were thrown into many folds (fig. 8), as described by Tamler[10] and others. There was severe edema of the choroid and part of the ciliary body anterior to the tube. The polyethylene tube had fallen out in processing. On the temporal side, the space that had contained the tube was partially filled with exudate and was surrounded by an intense inflammatory reaction. Anterior to the tube on the temporal side the retina was extremely degenerated, while in the corresponding area on the nasal side, the retina was replaced by hyalinized connective tissue (fig. 8). A ciliary nerve passed through an emissary canal underlying the polyethylene tube on the nasal side. There was an overlapping of the scleral margins of the canal, resulting in a shortening of the sclera on the nasal side (figs. 3 and 8). Posterior to the tube the retina was detached and exhibited mild degenerative changes. There was some proteinaceous exudate in the subretinal space. In one area just nasal to the optic nerve, the retina was adherent to the underlying choroid at the site of a scar of a perforating wound of the sclera (fig. 9). Posteriorly, the vitreous contained a partially organized hemorrhage. The lamina cribrosa was not depressed and, except for some thickening of the pial septa, the optic nerve in cross section was not remarkable.



A B

FIG. 7—Case 1. On the nasal side there is extensive necrosis and partial hyalinization of the ciliary body. The epithelium overyling the pars plana ciliaris is necrotic. (Hematoxylin and eosin; A, × 12; B, × 80) (A, AFIP Neg. No. 59-7189; B, 60-3932-1)



A B

FIG. 8—Case 1. The pigment epithelium and Bruch's membrane posterior to the polyetheylene tube (T) are thrown into many folds (A). The retina anterior to the tube is necrotic, but this is less prominent on the temporal side (A) than on the nasal side (B). Overriding of the scleral margins of an emissary canal is seen beneath the tube in B. (Hematoxylin and eosin; × 12) (A, AFIP Neg. No. 60-3935; B, 59-7191)

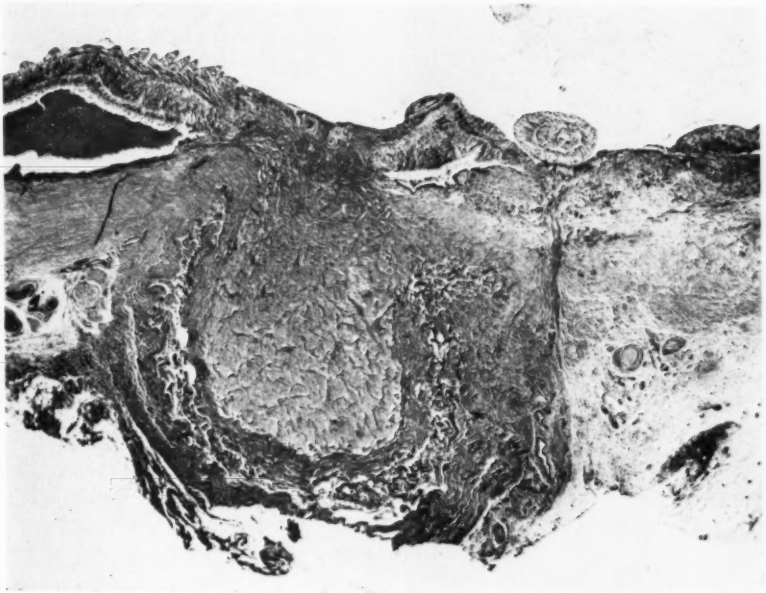


FIG. 9—Case 1. On the nasal side of the optic nerve there is a scar of a perforating wound of the sclera. This scar resulted from diathermy applied to the two small slitlike tears 1.5 disc diameters from the nerve at 9:30 o'clock. (Hematoxylin and eosin; × 14.) (AFIP Neg. No. 60-3936.)

Case 2

A 32-year-old white man was struck in the left eye with a snowball on December 25, 1957. He developed hyphema and chemosis of the left eye that failed to respond to outpatient treatment, and he was hospitalized on January 2, 1958. During the hospitalization he had an episode of glaucoma that was controlled with Diamox. On February 7, 1959, while in the hospital, a retinal detachment in the inferonasal quadrant of the injured eye was observed. No retinal tears were found, however. The patient was transferred to another hospital for further specialized care.

After one week of bed rest and occlusion there was no evidence of reattachment of the retina, and the patient was scheduled for surgery. On March 3, 1958, a scleral buckling procedure with circling polyethylene tube was performed under general anesthesia. The medial, inferior, and lateral recti were detached, and a scleral resection was performed around most of the globe from 1:30 to 11 o'clock, 12 to 15 mm. behind the limbus (fig.

FIG. 10—Case 2. The eye at the time of surgery. The polyethylene tube overlay the scleral resection, which extended clockwise from 1:30 to 11 o'clock, 12 to 15 mm. behind the limbus. (AFIP Neg. No. 60-5337.)

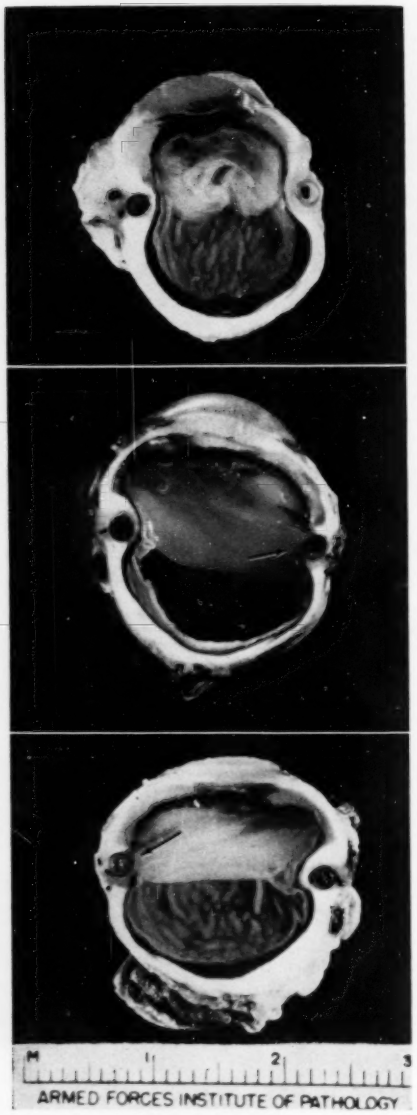


FIG. 11—Case 2. The eye has been opened in the vertical plane. The superior parts of the eye are seen on the left half of the top picture (the temporal calotte) and the center picture (the nasal side of the main block), while in the bottom picture (the nasal calotte) the superior portion is on the right. The vitreous, which is detached posteriorly, is adherent to the tube inferiorly (arrows in center and bottom pictures). (Top, AFIP Neg. No. 59-7362-1; Center, 58-7394; Bottom, 59-7362-3.)

10). Diathermy was applied to the bed of the resection and carried out to the ora serrata at 1:30 and 11 o'clock. Sutures through the scleral lips surrounding the resection secured the polyethylene tube in place. The 2-0 black silk suture within the tube was tied superiorly after a considerable amount of subretinal fluid was released through punctures in the area of resection. Immediately after the operation a vitreous hemorrhage occurred, and there was a high fever. Eleven days later a cataract was present. The tension was normal, but the results of retinal surgery could not be determined. On March 24, 1958, the patient was discharged, but on his return one month later, marked atrophy and inflammation of the left eye were observed. The inflammation continued, and on April 29, 1958, the eye was enucleated under general anesthesia.

Gross examination of the enucleated eye, which measured 21x23x20 mm., revealed a circling polyethylene tube surrounding the globe in the region of the equator. The episcleral tissues surround-

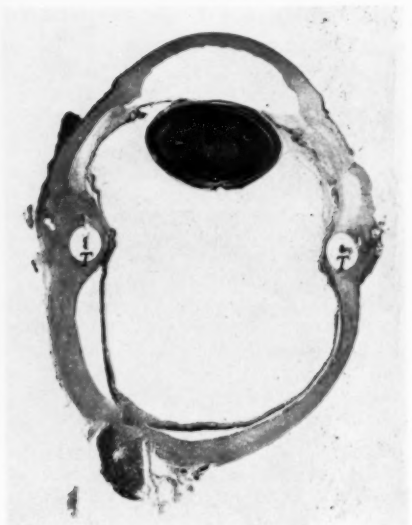
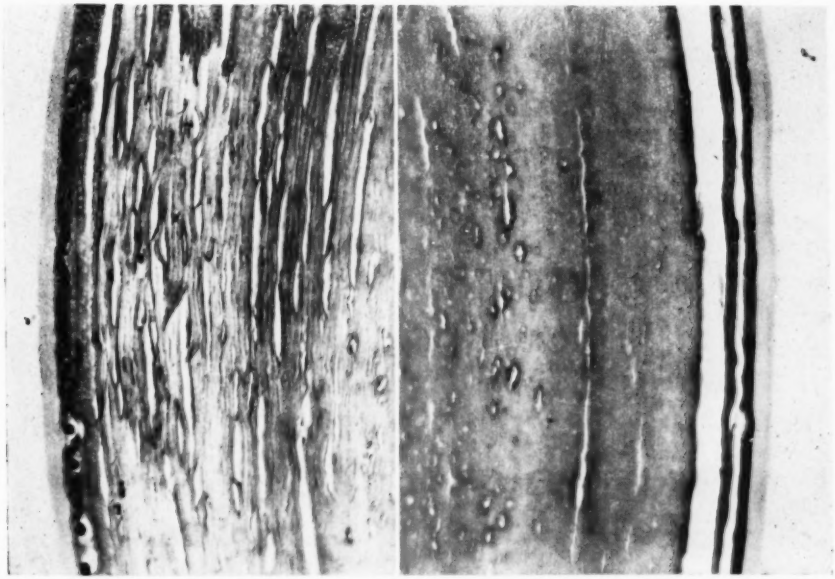
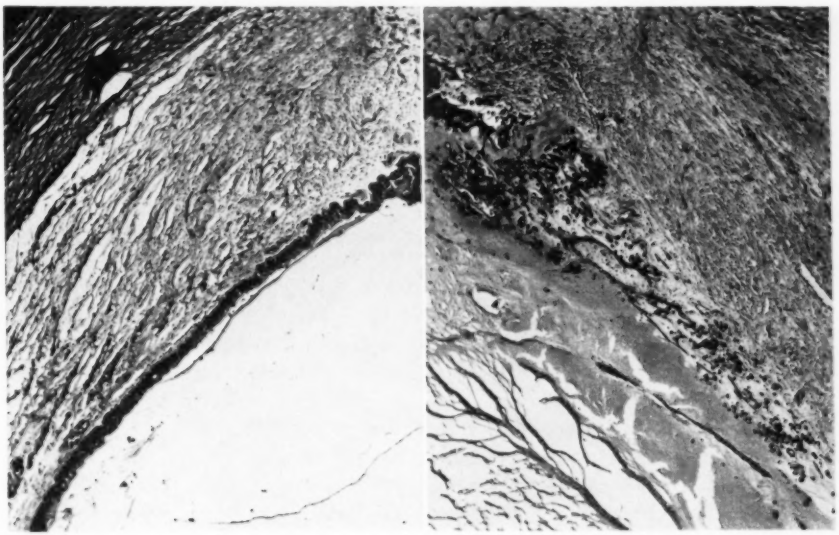


FIG. 12—Case 2. The anterior chamber is of average depth and is free of cells and exudate. Inferiorly (on right side of photomicrograph) there is extensive necrosis of the iris, ciliary body, and retina anterior to the polyethylene tube (T). The choroid is thickened anteriorly. (Hematoxylin and eosin; ×4) (AFIP Neg. No. 60-3937)



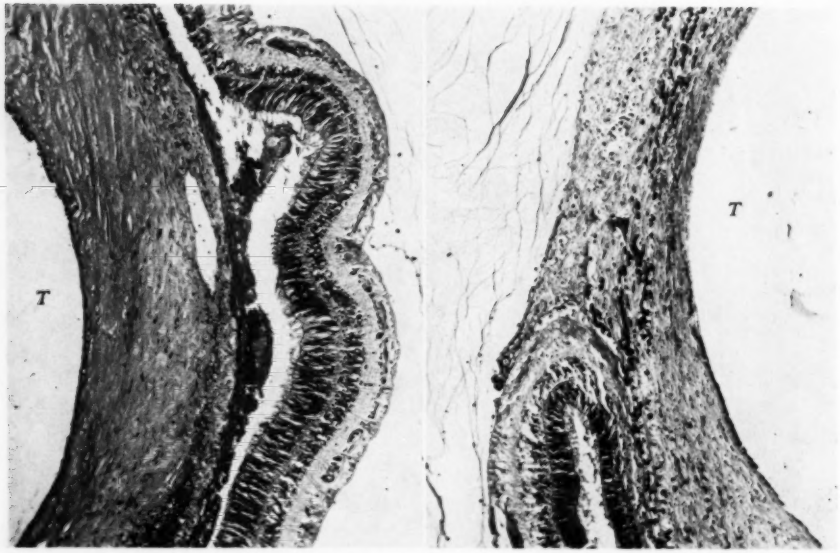
A B

FIG. 13—Case 2. The equatorial epithelium of the lens on the superior side (A) is viable, while the corresponding epithelium on the inferior side (B) is necrotic. (Hematoxylin and eosin; × 305) (A, AFIP Neg. No. 60-4548; B, 60-4547)



A B

FIG. 14—Case 2. Most of the ciliary epithelium on the superior side is viable (A) while there is extensive necrosis of the ciliary epithelium inferiorly (B). (Hematoxylin and eosin; × 50) (A, AFIP Neg. No. 60-3941-2; B, 60-3941-1)



A B

FIG. 15—Case 2. (A) The retina overlying the polyethlyene tube (T) superiorly is viable. (B) Inferiorly there is severe necrosis of the retina anterior to the polyethylene tube (T). Where the viable retina terminates, it is inverted and folded upon itself. (Hematoxylin and eosin; × 80) (A, AFIP Neg. No. 60-3940; B, 60-3940-2)

ing the tube were thickened. The eye was opened in a vertical plane (fig. 11). The iris-lens diaphragm was in place. Posterior to the tube, the retina was wrinkled but appeared viable. Anterior to the tube the choroid was thickened. The vitreous was detached posteriorly, displaced anteriorly, and in close contact with the degenerated retina anterior to the tube. Inferiorly, where necrosis of the retina was most marked, the vitreous was adherent to the inner surface of the polyethylene tube.

Microscopic examination revealed the cornea to be unremarkable except for some vascularization of the peripheral stroma and some pigment deposition on the endothelial surface. The anterior chamber was of average depth and free of cells or exudate (fig. 12). The angle and trabecular meshwork were occluded by peripheral anterior synechias. The pupillary margins of the iris and a delicate fibrovascular membrane that extended across the pupillary aperture were adherent to the anterior surface of the lens. The bulky lens was in place; it exhibited degenerative changes throughout the anterior and posterior cortex. Anteriorly, the lens epithelium was necrotic, but there was some viable epithelium at the equator, and this was more prominent on the superior side (fig. 13). Inferiorly, there was extensive postnecrotic scarring and hyalinization of the iris, ciliary body (fig. 14), and a portion of the retina anterior to the tube (fig. 15). Superiorly, there was some necrosis of the pupillary margin of the iris and a small area of necrosis in the ciliary body. The choroid

and ciliary body anterior to the tube were edematous, and there was a mild lymphocytic infiltration throughout the choroid. The space that had been occupied by the tube contained some black silk sutures (fig. 12) and was surrounded by intensely inflamed tissue, including several large, multinucleated foreign body giant cells. Chronic inflammatory cells surrounded some of the large vessels on the inner surface of the retina and also infiltrated the optic nerve head. Inferiorly, where extensive scarring had occurred, the vitreous was firmly adherent to the inner surface of the retina and ciliary body. In one area there was organized vitreous partially surrounding and in direct contact with the polyethylene tube (fig. 16).

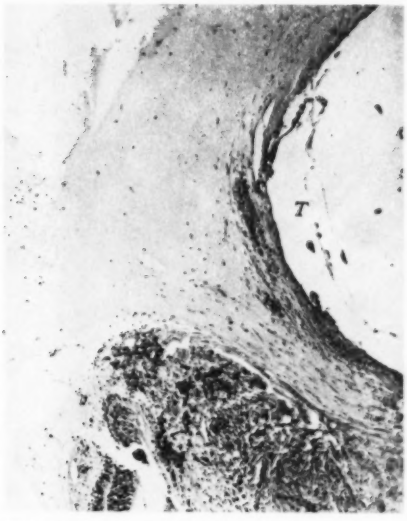


FIG. 16—Case 2. In one area inferiorly there is organized vitreous partially surrounding and in direct contact with the polyethylene tube (T). (Hematoxylin and eosin; ×50) (AFIP Neg. No. 60-4546)

Case 3

A 69-year-old man had had an amblyopic left eye since early childhood. The patient first noted floaters in his right eye in July 1958. Two months later, he developed a retinal detachment in the right eye, and a local ophthalmologist performed a diathermy operation. At that time there was a large detachment in the inferotemporal quadrant, but a tear was not seen until the middle of the operation. There was good drainage, but a few days after surgery the retina was again detached, and the patient was referred to another ophthalmologist for further treatment.

FIG. 17—Case 3. The anterior chamber is shallow. There is a prominent scleral buckle on both sides, and on the anterior portion of the scleral buckle on the temporal side there is a small retinal tear with its operculum (arrow). (Hematoxylin and eosin; ×33⅓) (AFIP Neg. No. 60-4498)

Examination on October 6, 1958, revealed a total retinal detachment with a horseshoe-shaped tear in the 9 o'clock meridian. In a number of places there were rigid radial folds in the retina. A second tear was suspected in the upper nasal quadrant but not definitely identified at the time of surgery.

On October 8, 1958, a scleral buckling with circling polyethylene tube was performed. The lateral, superior, and medial recti were detached. During careful dissection of postoperative scar tissue in the region of the lateral rectus, a sclerotomy opening from the previous operation was encountered at 9 o'clock, just slightly behind the equator. A good deal of subretinal fluid was lost before it could be stopped with two fine silk sutures. A lamellar scleral resection was performed

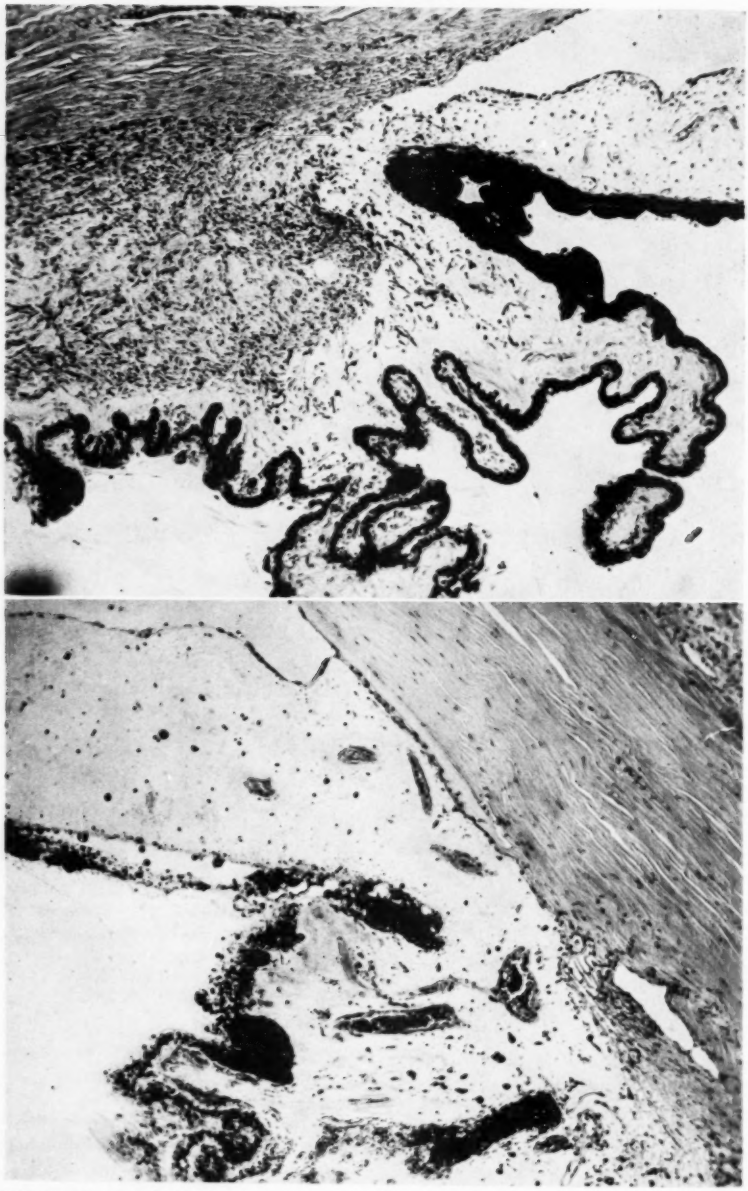


FIG. 18—Case 3. (Top) The iris and ciliary body on the nasal side are not remarkable. (Bottom) On the temporal side there is acute necrosis of the iris and ciliary body. (Hematoxylin and eosin; × 80.) (Top, AFIP Neg. No. 60-4502; Bottom, 60-4503)

and extended clockwise from 7:30 to 5 o'clock over three quarters of the globe. Diathermy was applied to the bed of the resection. A 1.25 mm. polyethylene tube was placed in the area of resection and carried around the globe. The silk suture running through the tube was tied at 6:30 o'clock near the inferior rectus muscle. Additional drainage openings were made in the area of resection in the inferonasal quadrant.

Five days following the operation the patient suddenly collapsed and expired. Autopsy examination revealed a phlebothrombosis of the left leg with acute pulmonary embolism.

Sections prepared from the right eye removed at autopsy revealed a fibrovascular pannus replacing Bowman's membrane in the periphery. Centrally, the corneal endothelium was degenerated, and a few inflammatory cells were adherent to the posterior surface of the cornea. The anterior chamber was shallow (fig. 17), and the angle on the temporal side was occluded by a broad peripheral synechia. The iris and ciliary body on the nasal side were not remarkable. On the temporal side there was acute necrosis of the iris and ciliary body (fig. 18). The anterior portion of the nonpigmented ciliary epithelium was necrotic, and there was dispersion of pigment from the pigment epithelium of both iris and ciliary body. Part of the ciliary muscle anteriorly was replaced by hyaline scar tissue, and there was some hemorrhage and congestion in the inner portion of the pars plicata ciliaris. The lens was in place and was not unusual. There was a prominent scleral buckle in the region of the equator on both sides (figs. 17 and 19). The polyethylene tube had fallen out in processing, and the space formerly occupied by the tube was partly surrounded by suture material and a few chronic inflammatory cells. The choroid was diffusely infiltrated with lymphocytic cells, and there was marked folding of the pigment epithelium and Bruch's membrane, particularly in the area overlying and surrounding the scleral buckle (fig. 19). The retina posteriorly was thrown into shallow folds, and in some areas there was mild degeneration of the visual processes. On the anterior part of the scleral buckle on the temporal side there was a small retinal tear (fig. 20). The retinal edges surrounding the tear were rounded, and the operculum was in close contact with the retina anterior to the tear. There were also some hemorrhages in the inner and outer layers of the retina anterior to the tear.

FIG. 19—Case 3. The scleral buckle on the nasal side. There is marked folding of the pigment epithelium and Bruch's membrane. (Hematoxylin and eosin; ×17) (AFIP Neg. No. 60-4500)

DISCUSSION

Some information[12] concerning the blood supply of the eye (fig. 21) is necessary in order to fully comprehend the lesions observed in these cases. With regard to the arterial supply of the uveal tract, the short posterior ciliary arteries supply most of the choroid. The anterior part of the choroid is supplied also

FIG. 20—Case 3. The retinal edges surrounding the tear are round and everted, and there are microcystic changes in the inner nuclear layers of the operculum. (Hematoxylin and eosin; × 100) (AFIP Neg. No. 60-4501)

by the recurrent ciliary arteries, which arise in the ciliary body from the major arterial circle of the iris and from the long posterior ciliary and anterior ciliary arteries before they have joined to form the circle. The two long posterior ciliary and anterior ciliary arteries supply the iris and ciliary body. The anterior ciliary arteries are derived from the arterial branches that supply the four recti. One artery emerges from the lateral rectus tendon, while two arteries come from each of the other tendons.

The four vortex veins, together with the anterior ciliary veins, drain the entire uveal tract. Large tributaries of the vortex vein drain the posterior part of the choroid, while the anterior tributaries drain the iris, ciliary body, and the anterior portion of the choroid.

The inner layers of the retina are supplied by the central retinal artery and drained by the central retinal vein, while the avascular outer layers are nourished by the choriocapillaris.

The central retinal artery is generally regarded as an end artery. Obstruction of this vessel is followed by a diffuse coagulative necrosis involving the inner retinal layers, but the outer layers are spared. Ischemic necrosis of the uvea following obstruction of its vessels, on the other hand, is uncommon, probably because of the extensive anastomotic and collateral circulation within the uveal tract.

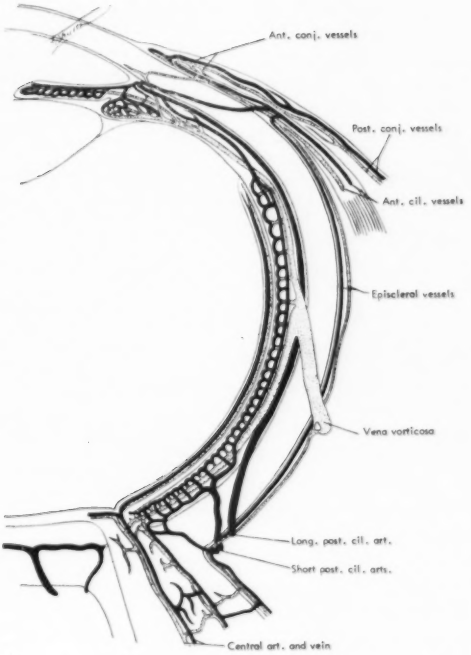


FIG. 21—The blood supply of the eye (modified from Leber). (AFIP Neg. No. 60-4269)

The nature of this extensive anastomotic circulation of the uveal vessels in man is illustrated by the case which Studer[9] reported in 1906. He described the histologic changes in an eye enucleated three weeks following an opticociliary neurectomy for glaucoma. The following description of the procedure is taken from his report.

Repeated attacks of glaucoma followed in the right eye and on February 3, 1900, opticociliary neurectomy was done. A vertical cut was made in the conjunctiva near the attachment of the external rectus. The muscle was fixed in a double hook and divided some millimeters from the ball. The optic nerve was then cut with scissors and the eyeball fully everted and the ciliary vessels divided. After checking the hemorrhage, the external rectus was sutured and the conjunctival wound closed.

It is interesting to note that hemorrhage into the anterior chamber occurred postoperatively. Because of recurrent pain the eye was enucleated on February 24.

According to Studer the most marked and extensive changes were found in the choroid and retina on the temporal side. The retina was reduced in thickness, and its characteristic structure was replaced by a homogeneous connective tissue with some fibers running in the plane of the retina. There was also intense pigmentation of the entire temporal portion of the retina. The underlying choroid exhibited considerable thickness, with hyperemia and extravasation of blood. The retina on the nasal

side was described as normal except for small, isolated foci of degeneration. It is surprising that Studer did not describe any necrosis of the iris and ciliary body, after apparent severance of the long and short posterior ciliary arteries as well as the anterior ciliary artery derived from the lateral rectus tendon. The remaining blood supply (anterior ciliary arteries from the superior, medial, and inferior recti) presumably was adequate to prevent necrosis of the iris and ciliary body.

In 1954, at the annual meeting of the Academy, Wilson and Irvine[11] described the pathologic changes following disruption of the blood supply to the iris and ciliary body in an eye that had been enucleated seven months after a retinal diathermy operation. During the operation, the lateral rectus muscle was detached and diathermy was applied to the region of the retinal tears on the temporal side. Two weeks after surgery, spontaneous hyphema occurred. The tension remained normal for a month to six weeks, during which time the temporal iris appeared to dissolve. Eventually the hyphema absorbed and objective evidence of iritis decreased, but because of persistent pain and faulty light projection the eye was enucleated.

Histopathologic examination revealed broad peripheral anterior synechias, posterior synechias with an iris bombé, and a large mature cataract (fig. 22).* The iris, ciliary body, and the portion of the choroid and retina anterior to the equator on the temporal side were markedly necrotic. Uveal pigment was dispersed throughout these tissues, which were partly replaced by hyalinized connective tissue (fig. 23). Much of the lens cortex

FIG. 22—Case of Wilson and Irvine.[11] There are peripheral anterior synechias, posterior synechias with an iris bombé, and a large mature cataract. Scarring of the sclera in the region of the equator and necrosis of the iris and ciliary body are seen on the temporal side to the left. (Hematoxylin and eosin; ×2¾) (AFIP Neg. No. 60-3928)

was liquefied, and the lens epithelium was absent anteriorly as well as in the equatorial region on the temporal side. The equatorial epithelium on the nasal side, however, appeared viable. The necrosis was felt to be consistent with destruction of the long posterior and anterior ciliary arteries on the temporal side. This description of the pathologic anatomy of ischemic necrosis of the iris and ciliary body following retinal diathermy operations is, to the best of our knowledge, unique. Others, however, have clinically observed iridocyclitis, cataract formation, and segmental atrophy of the iris following retinal diathermy operations. We suspect these complications result from necrosis in the iris and ciliary body.

In the cases in which circling polyethylene tubes are used, more factors are involved, and the possibilities for developing ischemic necrosis appear to be greater than in other types of retinal detachment surgery for the following reasons:

*Through the courtesy of Dr. A. R. Irvine, Jr., Pathologist, Estelle Doheny Eye Foundation, we have had the privilege of examining this eye microscopically.

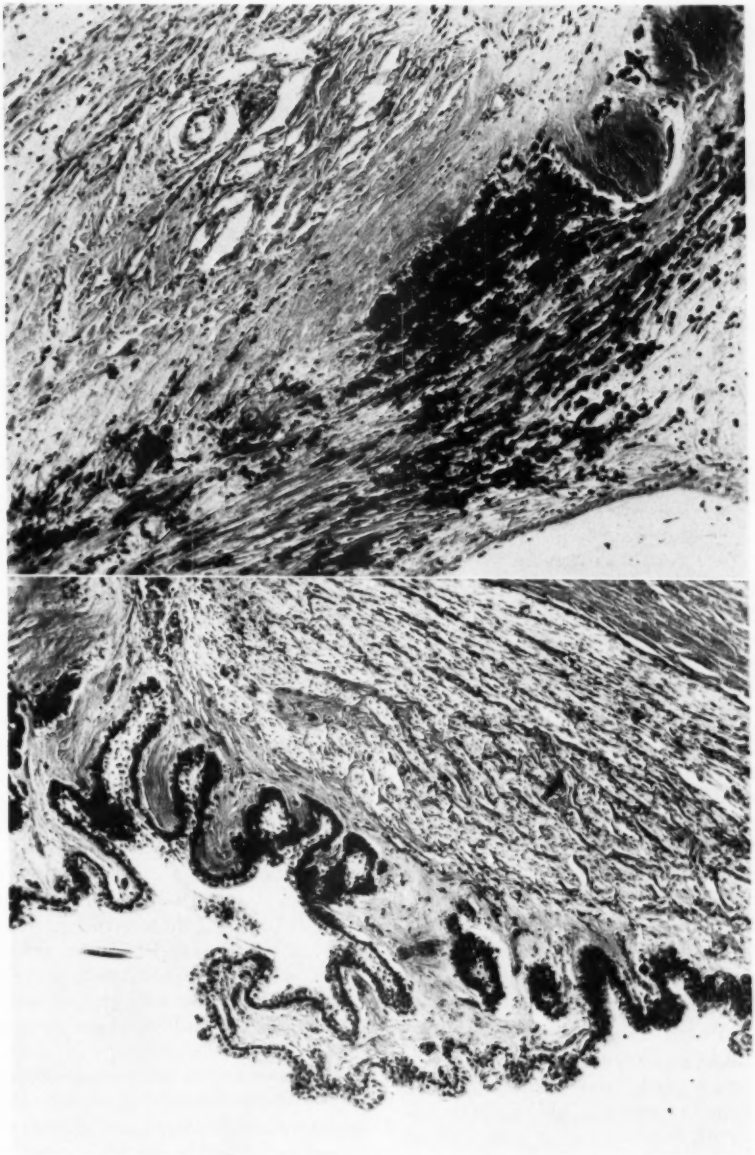


FIG. 23—Case of Wilson and Irvine.[11] (Top) The ciliary body on the temporal side is markedly necrotic. (Bottom) The ciliary body on the nasal side appears essentially normal. (Hematoxylin and eosin; × 80.) (Top, AFIP Neg. No. 60-3929-2; Bottom, 60-3929-1)

1. Usually, a greater number of rectus muscles are detached in scleral buckling operations with circling polyethylene tubes. At least two, and frequently three, muscles are tenotomized with this procedure.

Detachment of the rectus muscles in muscle surgery has produced necrosis of the iris. Leinfelder and Black,[5] in their experiments with transposition of the extraocular muscles in Rhesus monkeys, reported several cases of mild iridocyclitis and one case of heminecrosis of the iris. Girard and Neely[2] refer to two cases in which keratitis, iridocyclitis, necrosis of the iris, and secondary cataract followed muscle transplantation operations.

Kornbleuth and co-workers,[4] in discussing the effect of muscle surgery on aqueous dynamics, suggest that iridocyclitis, depigmentation of the iris, and secondary cataract following muscle transplant operations may result from long-standing suppression of the rate of flow of aqueous. These changes are more likely due, in our opinion, to necrosis of the iris, ciliary body and lens epithelium as a result of severance of the anterior ciliary vessels. Girard and Neely have pointed out that these complications have not occurred in children. This suggests some alteration in the uveal vessels and their anastomoses as a consequence of aging.

2. In most of these cases a lamellar scleral resection or some other type of scleral surgery is performed. When the procedure described by Schepens and his co-workers[7] is followed, one half to three quarters of the circumference of the globe is resected, and diathermy to the bed of the resection is therefore applied around more than one half of the globe. Schepens and his co-workers[8] warn against cutting the ciliary vessels and nerves when dissecting off the scleral lamella and advise against applying diathermy directly over them. The scarring produced by a diathermy application may be quite extensive, however, and result in obstruction of the long posterior ciliary vessels even if not applied directly over them. The two long posterior ciliary arteries travel in the horizontal meridian, and it is interesting that in all three of our cases the diathermy applications surrounded the course of these vessels on both the nasal and temporal sides.

3. Schepens and his colleagues[8] recommend cutting the vortex veins only when absolutely necessary. In their experience, however, severing one or two vortex veins is generally without consequence. This is understandable, since the other vortex veins are able to handle the venous drainage. There are usually four vortex veins, and they pierce the sclera obliquely approximately 6 mm. behind the equator of the globe. Each vein passes through an oblique scleral canal about 4 mm. in length. A tube circling the equatorial region of the globe could compress all the anterior tributaries of the vortex vein (fig. 24). If this occurred, and if several of the anterior ciliary veins were severed during detachment of the recti, the remaining anterior ciliary vein or veins might be unable to handle the venous drainage for that portion of the choroid anterior to the tube. Edema of the choroid anterior to the tube might then result, as we have seen in cases 1 and 2. The resulting stagnation in the circulation may have accelerated the onset of necrosis in the iris and ciliary body in these two cases.

4. Obstruction of the vessels that supply the anterior part of the choroid might cause degeneration of the outer retinal layers but would not cause necrosis of all layers of the retina such as we have seen in two of our cases unless the retinal arterioles were also occluded. Schepens and co-workers[7] describe an

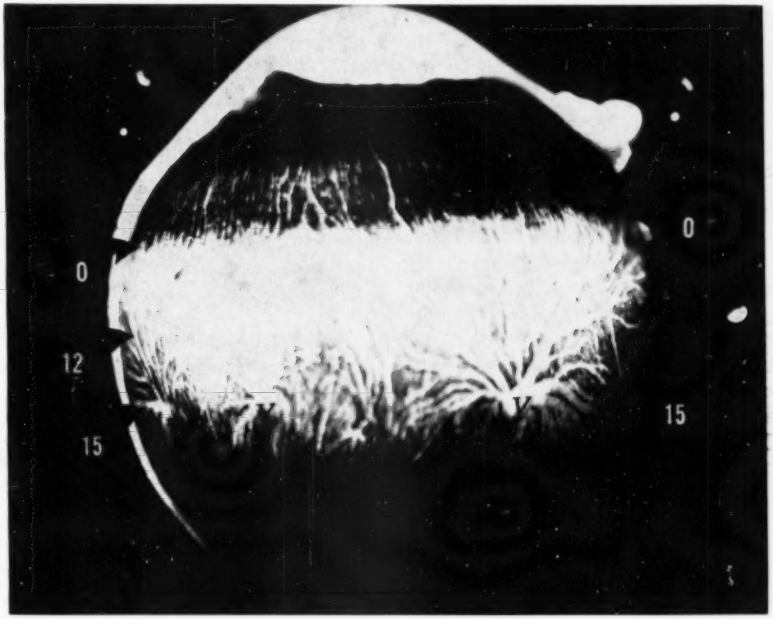


FIG. 24—Transillumination of a calotte showing the anterior tributaries of two of the vortex veins (V). The arrows indicate the ora serrata (0) and positions 12 and 15 mm. behind the limbus. (AFIP Neg. No. 60-5335)

artificial glaucoma that occurs during the course of a scleral buckling after the sutures are drawn and tied. If the pressure rises markedly, they recommend checking for the existence of retinal ischemia. With very high pressure the disc appears white, and no retinal vessels are seen at the disc. If this phenomenon is observed, they suggest loosening of the buckling sutures, use of Diamox intravenously, or paracentesis. Since the necrosis is confined to the portion of the retina anterior to the tube, we do not feel that obstruction of the central retinal artery is a factor in our cases. Obstruction of the retinal vessels anterior to the tube might result from a local compression by the tube. It seems more likely, however, that occlusion of these retinal vessels results from the direct effect of diathermy or from the subsequent chorioretinal scarring.

In our first case, the medial and inferior recti had been detached. In the laboratory the eye was opened in the horizontal plane. The necrosis of the iris, ciliary body, and lens epithelium was more prominent on the nasal side. We assume this side was more vulnerable, since the anterior ciliary vessels from the medial rectus muscle were severed. Diathermy underlying the tube and including the area traversed by both long posterior ciliary arteries probably destroyed one or both of these vessels. In addition, diathermy to the holes just nasal to the optic nerve may have de-

stroyed the long posterior ciliary artery on the nasal side. The necrosis of the retina anterior to the tube probably resulted from the direct effect of diathermy or from chorioretinal scarring produced by the diathermy, which extended from 2 o'clock to 10:30 o'clock.

In the second case, the medial, inferior, and lateral recti had been detached. In this case we opened the eye in the vertical plane, and the necrosis in the iris, ciliary body, and lens epithelium was more marked inferiorly. We feel that the anterior ciliary vessels from the superior rectus muscle must have provided some protection to the superior side. Diathermy to the bed of the resection again included the area traversed by both long posterior ciliary arteries. The necrosis of the inferior retina was probably related to the application of diathermy to the bed of the resection. The absence of necrosis in the superior retina may have been due to the fact that the scleral resection, which extended around three quarters of the globe, spared the superior side.

In case 3, we can only speculate as to whether the necrosis would have become more extensive if the patient had lived longer. We suspect that the necrosis might have progressed and eventually resulted in inflammation, cataract formation, intraocular hemorrhage, and atrophy of the globe.

An interesting observation is the fact that in our cases 1 and 2, as well as in the case of Wilson and Irvine,[11] cataracts developed following the detachment surgery (in our first case mild sclerosis of the lens was observed prior to surgery). Histologic examination revealed the degenerative changes in these lenses to be far advanced. In all of these cases, however, the degeneration of the lens epithelium was more prominent on the side on which the necrosis of the iris and ciliary body was more marked. We can only speculate as to whether these changes were directly related to interference with blood supply to the iris and ciliary body on that side or whether they were due to release of toxins from the necrotic tissue. In case 3 the time interval between retinal detachment surgery and the patient's death was too short to determine whether a cataract might have developed.

Another interesting observation is the occurrence of postoperative intraocular hemorrhage in the case of Studer[9] and Wilson and Irvine,[11] and in our case 2. This hemorrhage appears to be related to the uveal necrosis although the exact mechanism is not known. In case 1 the intraocular hemorrhage cannot be directly related to the necrosis of the iris and ciliary body, since it began at the time of surgery.

Three cases do not constitute a large series, and we do not wish to imply that the complications illustrated are either common or specific for the scleral buckling operations with circling polyethylene tubes. We have already pointed out that necrosis of the iris and ciliary body may occur after other types of retinal detachment surgery, as well as following muscle transplant operations. However, necrosis of the iris and ciliary body would seem more likely to occur following scleral buckling operations with circling polyethylene tubes than after other retinal detachment operations, for the reasons already discussed.

In conclusion, we should like to recommend the following precautions, which we feel might lessen the incidence of this complication:

1. Detach as few rectus muscles as possible—only those necessary for adequate exposure.

2. In reoperations, detach muscles previously tenotomized if possible.*

3. Make the scleral resection or other scleral surgery as short as possible.

4. In a large lamellar resection, try not to include the area traversed by both long posterior ciliary arteries.

5. Apply a minimum of diathermy to the bed of the resection, particularly around the long posterior ciliary arteries.

SUMMARY

This article reports three cases illustrating necrosis of the iris and ciliary body following scleral buckling procedures with circling polyethylene tubes. In two of these cases there was also necrosis of the lens and retina. These complications are believed to have occurred because of interference with the blood supply of the eye as a result of surgery. Certain precautions that might lessen the incidence of this complication are suggested.

Addendum: Since the presentation of this paper, a more extensive survey of the complications of retinal detachment surgery has been made. We have studied over 150 cases in the Registry of Ophthalmic Pathology in which retinal detachment surgery had been performed prior to enucleation. In approximately 15 per cent of these eyes we have found necrosis of the iris and ciliary body. A more detailed report of our observations on these cases was presented at the Annual Meeting of the American Medical Association in New York City on June 29, 1961.

*According to Kornblueth, et al.,[4] the rate of aqueous flow returns to its preoperative level about three months after surgery on the horizontal muscles. As a result, they assume that it takes several months for new anastomoses to form and replace the severed anterior ciliary vessels.

REFERENCES

1. Brockhurst, R. J.; Schepens, C. L., and Okamura, I. D.: The scleral buckling procedures: III. Technical difficulties of reoperations, Arch Ophthal, 60:1003-1012 (Dec.) 1958.

2. Girard, Louis J., and Neely, Robert A.: Agenesis of the medial rectus muscle, Arch Ophthal, 59:337-341 (March) 1958.

3. Kirk, Harold Q.: Case presented at first meeting of Midwestern Ophthalmic Pathology Club, Iowa City, Iowa, Jan. 16, 1960.

4. Kornblueth, Walter; Nawratski, Ilse, and Gabbay, Anwar: The effect of extraocular muscle surgery on aqueous humor dynamics, Amer J Ophthal, 48:321-326 (Sept.) 1959.

5. Leinfelder, P. J., and Black, Nelson M., Jr.: Experimental transposition of the extraocular muscles in monkeys, Amer J Ophthal, 24:1115-1120 (Oct.) 1941.

6. Okamura, I. D.; Schepens, C. L., and Brockhurst, R. J.: The scleral buckling procedures: IV. Reoperations following scleral bucklings, Arch Ophthal, 62:445-458 (Sept.) 1959.

7. Schepens, Charles L.; Okamura, I. D., and Brockhurst, R. J.: The scleral buckling procedures: I. Surgical techniques and management, Arch Ophthal, 58:797-811 (Dec.) 1957.

8. ———: The scleral buckling procedures: II. Technical difficulties of primary operations, Arch Ophthal, 60:84-92 (July) 1958.

9. Studer, Theodor F.: On pigmentation of the retina after optico-ciliary neurectomy in man (abridged translation from the German edition by Dr. Ward Holden), Arch Ophthal, 35:333-348, 1906.

10. Tamler, Edward: Observations on the pathology of retinal detachment operations on human eyes, Trans Pacif Coast OtoOphthal Soc, 38:59-96, 1957.

11. Wilson, Warren A., and Irvine, S. Rodman: Pathologic changes following disruption of blood supply to iris and ciliary body, Trans Amer Acad Ophthal Otolaryng, 59:501-502 (July-Aug.) 1955.

12. Wolff, Eugene: The Anatomy of the Eye and Orbit, ed 4, New York, McGraw-Hill, 1955, pp. 79-87.

DISCUSSION

DOHRMANN K. PISCHEL, M.D., San Francisco: May I thank Doctors Boniuk and Zimmerman for the opportunity of discussing their excellent paper. The findings they have shown are beautifully worked out and well documented. How often such extreme changes and mutilation of the eyeball occur after encircling tube operations is, of course, not accurately known. It must be remembered that two of these three cases were bad failures. The many successful cases do not generally become available to the pathologist.

However, it is to be expected that the more radical an operation is, the more it insults the tissues involved, the more surgical accidents are likely to occur, and therefore more postoperative complications will appear. During the twenty years when almost all detachment surgery was of the diathermy type, pathological specimens were practically nonexistent. Even if a diathermy operation was a failure, it left the eye in such a good condition that enucleation was not necessary.

In the past ten years, some type of scleral resection operation has been performed in a high percentage of all retinal detachment cases, and more recently, the more radical and more mutilating operation of the encircling tube type has been performed in increasingly greater numbers. It is, therefore, natural that in these last few years more complications have arisen and that more eyes have had to be removed because of pain and irritation.

All eye pathology laboratories now have a discouraging number of specimens of unsuccessful scleral resections or encircling tube operations.

If these more radical operations carry a greater risk, is one justified in performing them? If an eye is in such bad condition that a cure can only be expected with a radical operation, then the risk should certainly be taken. But there must be a careful exercise of judgment in each case. In the Symposium on Scleral Resection held before this Society in 1957, I gave a resume of types of cases where some form of scleral resection should be used and will not repeat this now.

However, I would like to call attention to *case 2* of today's presentation. Here was a small retinal detachment of only one quadrant (inferior nasal) in extent. It would seem that such a case should have had a diathermy operation, or at most small simple scleral resection, not a radical encircling tube.

Therefore, this precaution, that of using the least radical operation which has a good chance of success, should be added to those other precautions mentioned today.

I should also like to emphasize one point. The previous speaker suggested that the diathermy used should not be excessive. This is most important, for many operators seem to feel that if a little diathermy is good for detachment, a lot more is better! If diathermy is applied to the sclera over which the tube will be laid, it should be kept at a minimum. Any scleral point treated with diathermy becomes necrotic, and if this necrotic sclera is then subjected to the continuous pressure of a foreign body, bad complications may arise. The worst of these is the complete erosion of the sclera, the tube actually coming through the sclera into the vitreous cavity. This is shown in the second case mentioned, in which the tube had eroded through the sclera and choroid, and even the retina, so that the vitreous itself was in contact with the tube. That a lesser amount of inward erosion occasionally takes place has been my experience from cases which have come to me for reoperation. I must, with embarrassment, confess that I have two bad cases of my own to report. In one case, at reoperation the tube which had been on the surface in the upper half of the globe was found to have eroded almost to the choroid in one small area, and this may have contributed to the eventual failure of this case. In another case, the placement of an encircling tube comprised the ninth operation on this eye (and my second). Here, the tube eroded completely through the badly damaged sclera in one quadrant, so that it could be seen in the fundus with the retina and some choroid draped over it. Neither of these patients had an increased intraocular tension.

Another precaution to be mentioned is that the tube should not be pulled up too tightly. The looser the tube, the less danger of eroding through the sclera. A tremendous buckle is rarely needed. Graham Clark has shown that a tubing of 180 degrees at the equator will decrease the volume of the vitreous cavity by almost 20 per cent. A greater effect than this is hardly ever desirable.

I concur with the precaution that as few muscles be tenotomized as possible. Taking off two muscles allows access to three fourths of the circumference of the globe, surely ample space for most cases. With so much space available, may I repeat another of the author's precautions, that the resection be as small as possible, as is consistent with the expectation of achieving a cure. Removal of only one

muscle usually gives all the space needed for an operation. I would further like to point out that a long resection or diathermy over a large area, that is, one extending over three fourths of the globe, is often not tolerated by an eye, as is shown by cases 1 and 2 of today's presentation.

In a more optimistic vein, I should like to show some slides of a successful case of an encircling tube. [Slides] This eye was obtained six months after the operation, the patient having had a fatal gastric hemorrhage. This was the third operation on this eye. Only two muscles were cut in this operation. The size of the resection was less than half of the circumference of the globe, and was only 2 mm. wide; the tube was tightened only moderately. A complete reattachment was obtained of a detachment that occupied over half of the fundus. As the macula was cystic postoperatively, vision was only 20/200.

As the pictures show, the hole in the retina was on top of the slightly inward bulging sclera. The retina was attached to the underlying choroid in this region. The retina can be seen to be in normal condition, with none of the necroses or hemorrhages seen in the other cases cited today. Thus, in the proper case and with conservative technique, a good result can be obtained with an encircling tube operation.

DR. BONIUK: I would like to thank Dr. Pischel for his remarks. His comments and clinical observations were very pertinent and have added to the presentation.

I would like to emphasize the importance of the blood supply of the eye in other surgical procedures, including the Hummelscheim operation and other muscle transplant operations, as we have mentioned in the presentation.

The severe reaction we frequently see following cyclodiathermy may be related to the destruction of the ciliary vessels as a result of excessive diathermy during the operation.

TUMORS FOLLOWING RADIATION ABOUT THE EYE

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MANY complications following radiotherapy about the eye, especially in the treatment of retinoblastoma, have been studied.[17] Since neoplasms in irradiated tissue are uncommon and occur after protracted periods following radiation, this complication is documented less well than others in the usual follow-up report. This paper reviews eight published cases and presents nine additional cases of malignant tumor and one case of benign tumor following radiation for retinoblastoma. In addition, three cases of cancer of the skin occurring in the area of the eye following radiation for other reasons are reported.

Many of the energy levels of ionizing radiation, from low voltage grenz rays to supervoltage beams, and from alpha to gamma rays, have been used for treatment in ophthalmology. Although in recent years the frequency of complications has been reduced by the downward revision of the dosage schedules, undesirable side effects were previously common even in the therapeutic range. Among the complications produced by high energy sources (x-ray and gamma rays) but not yet observed with supervoltage therapy, a most important one has been the occurrence of neoplasms in the radiated tissue.

Cade[3] in 1958 studied the world literature and found only 300 cases of cancer following therapeutic radiation, the most important of which are summarized here in chronological order:

Porter & White,[14] 11 cases of carcinoma following chronic x-ray dermatitis. (1907)

Rowntree,[18] 5 cases of squamous cell cancer following x-ray exposure. (1908)

Cahan, Woodard, Higinbotham, Stewart and Coley,[4] 11 cases of osteogenic sarcoma. (1948)

Deller,[6] sarcoma of tongue after radium treatment for carcinoma. (1951)

Auerbach, Friedman, Weise and Amory,[1] osteogenic sarcoma in patients treated for metastatic seminoma of the testes. (1951)

Jayes and Dale,[8] sarcoma after x-ray treatment for thyrotoxicosis. (1951)

Goolden[7] reported three patients treated for thyrotoxicosis and one for tuberculous cervical adenitis who developed cancer of the laryngopharynx. (1951)

Also included were reports by Jones,[9] two cases of sarcoma of soft tissue and bone. He quoted thirty-nine additional cases of osteogenic sarcoma following treatment for arthritis, tuberculosis, fibrous dysplasia, and bone cysts. (1952)

Petersen[12] reported 21 cases of radiation induced cancer; of these 19 followed therapy and two followed diagnostic procedures. (1954)

To the above described material in the literature prior to his report, Cade added 34 cases. Twenty-five of these were *epithelial* tumors which occurred following treatment for hirsutism, ringworm, acne, goiter, sycosis barbae, keloid, syringomyelia, lupus, thyrotoxicosis, and "enlarged lymph nodes." In one instance the patient received his radiation exposure during a prolonged

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colon study with barium enema. In the remaining nine cases *osteogenic sarcoma, spindle-cell sarcoma, fibrosarcoma,* and *"sarcoma of the buttock"* developed in patients treated for soft tissue sarcoma, nevus of the skin, thyrotoxicosis, scleroderma, carcinoma of the cervix, papilliferous carcinoma of the thyroid or osteroclastoma of the ischium. Cade stresses the following points:

1. The majority of victims were submitted to radiation for benign conditions. Only four patients in his series were treated for cancer (breast, thyroid, cervix, soft tissue sarcoma).
2. The latent period between exposure to radiation and development of cancer ranged from 8 to 56 years.
3. Cancer developed exactly at the site severely damaged by radiation.
4. All varieties of cancer; carcinoma and sarcoma were produced by radiation.

More recent reports have included a study of postradiation sarcoma of bone (Sabanas and colleagues[19]) in 17 patients. Fourteen tumors occurred at the site of a pre-existing benign bone lesion, and three in previously normal bone in which radiotherapy was given for lesions in adjacent tissue. Further, it was shown that radiation was not curative alone and was not even helpful as an adjunct to surgery, so that its use in treating these lesions was not justified. Palmer and Spratt[11] have shown an increased incidence of pelvic cancer following radiation for benign conditions, most of which were fibroids. Slaughter and Southwick[23] reported nine cases of gastrointestinal cancer following radiation.

The most common lesion treated by high voltage radiation in the practice of ophthalmology is retinoblastoma, but occasionally periocular tissues have received ionizing radiation in occupational exposure, or in treatment of lymphosarcoma, acne and eczema (table I).

In general, the features stated by Cade apply to the tumors in the area of the eye with the important exception that exposure was usually given for malignant, and not benign, conditions.

I. RETINOBLASTOMA

Although the first reported case of retinoblastoma treated by radiation was described by Axenfeld[2] in 1914, the largest series of such treatments is that of Reese and his colleagues,[16] which began in 1936 and has continued to the present. The earliest dosage according to Schoenberg's analysis of the literature[21] was ". . . to use X-ray or radium in massive doses without delay, on the better eye, as soon as a small mass is discovered in the retina; . . ." This resulted in a large variety of major and minor complications of radiation, but it is the development of neoplasm, usually malignant, that concerns us here. This has occurred in 9 cases (in Reese's series, Cases III, VII, VIII, and in cases 1, 2, 4, 5, 7, and 10). (See fig. 1 and table 1.) The other patients in our series were culled from the Armed Forces Institute of Pathology files.* Since Reese began this work, the dosage of radiation gradually has been reduced, and now a significantly lower dosage is supported by chemotherapy.[16] In calculating the occurrence of this complicating disease, we shall include only those patients in whom radiation therapy was completed a greater number of years ago than the shortest known latent period. Therefore, only those treated before 1956 need be considered. Of the 170 patients, the number with secondary neoplasms is 9 (8 malignant; 1 benign), a total incidence of 5.3

*Since preparation of this paper another case of chondrosarcoma following irradiation for retinoblastoma has been reported to the author by Dr. Lorenz Zimmerman.

TABLE I

PUBLISHED CASES	AGE AT EXPOSURE YEARS—MONTHS	INTERVAL TO RADIATION THERAPY (YEARS)	REASON FOR EXPOSURE	TYPE OF TUMOR	DOSAGE	SITE OF TUMOR (IDENTIFIED BY NO. IN FIG. 1)	EXTENSION	METASTASIS	RESULT
Tebbet and Vickery[27]	1-6	7	Retinoblastoma	Osteogenic sarcoma	9,900 r x 2	Superior orbital margin (I)	Ethmoid & maxilla Intracranial	None	Died
Zimmerman and Ingalls[30]	1-6	9.5	Retinoblastoma	Bizarre radiation reaction	8,800 r x 2	Inferior lateral rim, Inner canthus (II)	Antrum & maxilla	None	Died
Cahan, et al.[4]	2-6	6	Retinoblastoma	Osteogenic sarcoma	11,600 r & 11,200 r 2,500 r & 2,400 r	Inner canthus (III)	Maxilla, orbits	None	Died
Schoenberg[20,21]	2-0	27	Retinoblastoma	Fibrosarcoma	36 mc x 4 hrs. 58 mc—1 cm. from eye x 8 hrs.	Temple (IV)		None	Died
Pettit, Chamness and Ackerman[13]	0-6	5	Retinoblastoma	Fibrosarcoma	Not known	Inner canthus (V)	Ethmoid, antrum	None	Died
Reese, Case 2[17]			Retinoblastoma	Necrotic sarcoma	Not known	"In pathways" (VI)		None	Died
Reese, Case 1[17]	5-0	8	Retinoblastoma	Rhabdomyosarcoma	9,000 r, 6,000 r 1,800 r	Temporalis muscle (VII)	Intracranial	None	Died
Skolnik, Fornatto[22] and Heydemann	0-6	9	Retinoblastoma	Chondrosarcoma	"9,600 right 3 mil/k seeds for 6 days"	Nose (VIII)	Ethmoid, Intracranial	None	Died
Mann[10]	3-0	4	Glioma, optic nerve	Meningeal sarcoma	5,500 r	Orbit (IX)	Frontal bone	None	Died
Our Series									
Case 1	1-6	6	Retinoblastoma	Fibrosarcoma	6,000 r x 2 OU Temple & Maxilla	Temple (1)	Maxilla, temporal muscle mandible, dura	Lung, cervical nodes	Died
Case 2	0-6	9	Retinoblastoma	Fibrosarcoma	7,800 r x 2	Nose (2)	Antrum	Cervical nodes	Died

Case 3	0-4	5	Retinoblastoma	Osteogenic sarcoma	8,000 r x 2	Bridge of nose, socket (3)	Maxilla, frontal nasal bone	None	Died
Case 4	0-6	4	Retinoblastoma	Osteogenic sarcoma	8,000 r x 2	Orbit and nostril (4)	Orbits, sphenoid, nasal septum, brain, frontal ethmoid bones	None	Died
Case 5	0-8	15	Retinoblastoma	Mesenchymoma	8,000 r x 2	Nostril (5)	Antra, nose, orbits, nasopharynx	None	Died
Case 6	0-2	15	Retinoblastoma	Undifferentiated sarcoma	7,500 r & 6,500 r (radon)	Temporal orbital wall (6)	Infraorbital & optic foramina	None	Died
Case 7	1-0	10	Retinoblastoma	Carcinoma	8,000 r x 2	Tear sac area (7)	Bone invasion locally	Cervical nodes	Died
Case 8	4-0	26	Retinoblastoma	Squamous carcinoma	4,000 mgh x 7 OD 8,000 mgh x 3 OU	Upper lid opposite orbit (8)		Cervical nodes	Alive, lymph node involvement
Case 9	5-0	9	Retinoblastoma	Basal cell carcinoma	1,200 r x 2 (AP & lateral) OU (5 x 5 c.m.)	Skin of temple (9)		None	Alive, recurrence excised
Case 10	0-6		Retinoblastoma	Fibromatosis	3,100 r x 2	Brow (10)	Dermoid-like bone defect		Alive
Case 11	20-40 yrs.	?	Exposed while preparing radium needles	Basal cell carcinoma	Not known	Lids			Alive
Case 12	18-23 yrs.	30	Acne	Basal cell carcinoma	2, 3 x wk.— 4-5 years	Lids			Alive
Case 13	60 yrs.	6	Lymphosarcoma lacrimal sac	Basal cell carcinoma	4,000 r	Skin over lacrimal sac			Alive

Mgh = milligram hours.

per cent. It would be impossible to estimate the number of patients treated by this or other roentgen ray techniques elsewhere, or by the use of radon seeds, a method more commonly used in Great Britain.

Eight cases (and another possible one[28]) of sarcoma following radiation for retinoblastoma already have been reported (table I). In one of these cases, the patient also had a benign tumor. In our series, we present 9 patients with malignant tumors and one with a benign tumor, not previously reported, arising in tissues receiving radiation during treatment for retinoblastoma, 8 of these by roentgen therapy and two by radium or radon seeds.

Dosage

The earlier reports on radiation treatment of retinoblastoma made reference only to the dosage in air, at the skin, without specific consideration of the actual tissue absorption. More recent publications state the calculated tumor dose, which in the case of retinoblastoma is radiation absorbed in the posterior segment of the globe. Generally, the radiation has been administered through two portals in paths which overlap in the area of the tumor. The dosage in each pathway is highest at the skin and decreases toward the tumor, where it is reinforced by radiation given through the other portal. In the area of the tumor, therefore, the greatest energy absorption is obtained. Although in some instances postradiation tumors have developed near the skin, where it would be relatively simple to calculate the dosage, most of the tumors arose deeper in tissue. An estimation of the dosage in these areas is a complex geographic computation and will be the subject of a later report.

All the patients but one received the substantial dose generally recommended in the past twenty years. The notable exception is the patient who developed a basal cell carcinoma following a dose which was of the order of one-sixth the usual dose. This amount of radiation is less than that which is widely used in the treatment of such common skin lesions as basal cell carcinoma. Tumors following radiation in these cases are not known and occurrence of the carcinoma reported here is without explanation. Data which would permit a critical study of the minimal dose which will result in tumor formation is not available in our series or in the previously published reports.

Presenting Complaints

In the eight cases of malignant tumor reported following radiation for retinoblastoma after intervals ranging from five and a half to twenty-nine years after treatment, the onset of a new disease was heralded by the appearance of a mass in or near the radiated areas. Most were subcutaneous, but one of these lay behind the eye and resulted in exophthalmos. One tumor was associated with tenderness in the area.

A subcutaneous mass was the presenting complaint in seven of our ten cases. In three of these, the mass first appeared in the temporal region; one in the skin, and two in the temporal orbital wall. Four other masses were noted in the area of the lacrimal sac, in the upper lid and opposite orbit, at the inner canthus, and bridge of nose and brow respectively (fig. 1). In three patients, nasal bleeding marked the presence of exuberant tissue with polyp formation and intranasal tumor.

Nasal bleeding was not a rare complication in the earlier reported series of radiation for retinoblastoma and was noted in 9 of 55 patients. In only one patient was there pain and tenderness,

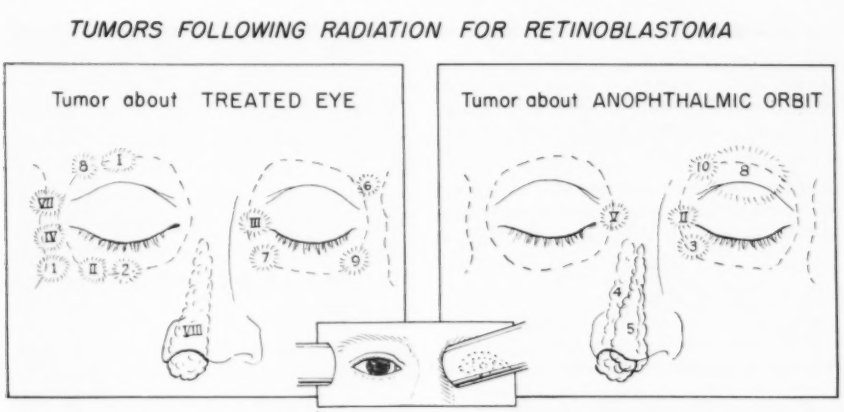

FIG. 1—Positions of tumors studied. The Roman numerals indicate the published cases and the Arabic numerals those in this series. In the insert, the portals are positioned for treatment of a right eye and would be reversed for treatment of a left eye.

and this (as in the published group) occurred only when the mass was in the area of the lacrimal sac. In the ten cases we are reporting here, in five patients the enucleation of one eye was necessary, and both eyes were enucleated for a variety of intraocular complications in the other five.

Treatment

Of the eight published cases of neoplasm following radiation for retinoblastoma, the treatment is known in six. In these patients, radical facial surgery (in one instance revised up to three times) was performed, but always unsuccessfully. A fourth patient was subjected to exenteration and craniotomy, and a fifth to local excision only. In the sixth patient, only betatron radiation was used. All of these treatments did not affect the continued growth of the tumor, and all patients died of the secondary disease.

Of the ten patients being reported here, at the time of initial examination five showed evidence of bone invasion as demonstrated by roentgenograms or operation. In another patient at operation, invasion of the infraorbital and optic foramen was seen and in a seventh roentgenographic examination showed clouding of the antrum but not definite bone invasion. In the eighth patient, there was no bone involvement. In the ninth, the lesion was a superficial skin tumor without bone invasion. In the tenth patient, who had a benign tumor, a shallow fossa suggesting a dermoid cyst was seen but no bone invasion.

Because of this frequent bone and/or sinus involvement, nothing short of extremely radical bone surgery of the face and head could have been considered in several patients. In one instance in which this was performed, the operation was an extremely mutilating procedure, and after eighteen months there was recurrence and lung metastasis. In one other instance, no local treatment was carried out because of metastasis to cervical nodes and extensive bone invasion. In five patients, the disease at clinical onset was so extensive that definitive therapy was not attempted. However, in two of these patients supervoltage radiation slowed the growth of the tumor and increased the comfort of the patient. The patient with squamous cell carcinoma

was treated by excision of the local mass and of two nodes. The basal cell carcinoma and a local recurrence have been excised. All but the patient with basal cell carcinoma and another with squamous cell carcinoma died within a few months following treatment. The former patient is alive and well eight years after the initial excision. The latter patient is alive with evidence of metastasis to local nodes.

Age of Onset of Tumor and Interval Following Radiation

The nine patients with malignant tumor following radiation for retinoblastoma ranged in age from 7 to 30 years; eight of these were 16 years old or younger. Since patients with retinoblastoma were necessarily in the younger age group, the relative youth of these patients has no significance in regard to the susceptibility of tissue in the young to tumor formation following radiation.

The interval between initial treatment and postradiation neoplasm ranged from four to twenty-six years. In all but one case, the postradiation neoplasm occurred within sixteen years. The average interval for osteosarcoma was 6.5 years; for rhabdyomyosarcoma, fibrosarcoma, mesenchymoma, and undifferentiated sarcoma, 12 years; for chondrosarcoma, 9 years; and for carcinoma 15 years.

Benign Radiation Reactions

Even more frequent throughout the literature than invasive or metastasizing tumors which occur in radiated areas, are instances of fibromatosis. In some published reports, the differentiation between this reaction and aggressive tumor is not clearly documented. Of interest in this regard is the case published by Zimmerman and Ingalls in which such a reaction occurred. Seven years after radiation, a nodule appeared. The pathologic report was: "The huge pleomorphic cell and the vascular reaction observed is interpreted as reactive and possibly a radiation reaction. Unequivocal evidence of neoplasia was believed to be lacking." There was no recurrence at the site of removal of this lesion, which involved the left inner canthus and the side of the nose. Three years later a true sarcoma developed in the opposite orbit.

In addition to the nine patients with malignant tumor in the series here reported, one patient was observed at routine examination to have a mass in the brow of the anophthalmic orbit. This appeared clinically to be a dermoid, and the roentgenographic findings were compatible with this diagnosis. The pathologic picture was that of fibromatosis, and the lesion has not recurred since its local removal three years ago.

CASE 1

The patient was first seen at the age of 1.5 years with bilateral retinoblastoma. The lesions were small enough that there was reason to consider radiotherapy to each eye. Therefore, instead of enucleation of either eye, the surgeons elected to irradiate each eye, using a temporal and a maxillary portal (6000 r x 2 to each eye). The child did well until 5.5 years later, when a lump was noted on the right side of the temporal region with swelling of the lids. A hard mass was noted in the right lower lid. It was adherent to bone and continuous with a mass in the lower temporal region of the orbit adjacent to the temporal portal. Roentgenographic examination showed "extensive and irregular deformities involving the lateral wall and adjacent temporal fossa. The zygoma is included in the defect along with the temporal arch. The zygomatic bone itself is identifiable and is displaced and is thoroughly involved in the process. The zygomatic process of the frontal bone is missing (fig. 2)." A biopsy showed fibrosarcoma and extensive surgical excision was carried out. At that time the excision included the right temporal muscle, the coronoid process of the mandible, part of the masseter and the zygoma, the entire right maxilla,

FIG. 2—Case 1. Roentgenogram showing extensive involvement of bones of the face.

part of the palate, the lower eyelid, the ethmoids and the right orbital cavity, and the adjacent dura.

The patient did well for almost eighteen months without any evidence of disease. At the end of that period, routine examination revealed nodularities in the high right neck, and the patient was readmitted to the hospital. Roentgenograms of the chest showed metastasis to the lung. The patient died shortly thereafter.

Pathology

The specimen shows a densely collagenous tumor with scattered spindle cells. Bizarre cells with large nuclei, which are present in small numbers, are not characteristic of fibrosarcoma generally but are common in postradiation tumors (figs. 3 and 4). In spite of these atypical cells, anaplasia is not extreme and the specimen resembles even the local noninvasive fibromatous reaction which may occur after radiation. The course of this tumor identifies it as a true sarcoma. Armed Forces Institute of Pathology consultants "found it impossible to make an unequivocal diagnosis", from the material available.

Diagnosis: Fibrosarcoma, postradiation.

CASE 2

The patient was first seen at the age of 7 months. A month earlier the parents had noticed a "light reflex" in the right eye. The left eye showed advanced disease and was enucleated. The right eye showed a large globular white vascular mass occupying the nasal half of the fundus, obscuring the disc. Using 260 kilovolts, 30 milliamperes, 60 centimeters target skin distance (TSD) and 2.5 centimeters cones, a 1.5 copper filter, 400 r was given per treatment to the right temple and the left nose.

Three weeks after the beginning of treatment, examination of the fundus showed a remarkable regression of the tumor with a deposition of calcium. A considerable number of calcium globules were noted in the vitreous. A dosage of 7600 r was given to each of the two portals. Two months later, it was noted that the lesion occupying the nasal and lower portion of the fundus showed almost complete calcification. It was well demarcated and the entire border was easily seen. In another two months, the cornea was seen to be steamy and the tension was elevated. The lesion in the lower part of the fundus was progressing and rather elevated, hazy and yellow. Two months later, the eye was considerably congested, the pupil was dilated and the tension elevated. The further growth of the tumor was obvious, and there was secondary glaucoma. Shortly thereafter, the right eye was enucleated. The patient was not seen again by Dr. Reese, but letters from the parents indicated that the child was growing normally.

Eight years after treatment, the patient's rhinologist reported that there were several bleeding points on the nasal septum. The right antrum transilluminated darker than the left, but there was no involvement of the neck. Roentgenographic examination showed "an erosive process involving the inferior and lateral portions of the right antrum, which was fairly heavily clouded. From this and the history in this case, it is in all probability a pathological condition due to malignancy."

A year later, the patient developed a mass in the right side of the neck in the region of the parotid gland. A section was removed from this tissue and diagnosed as a "sarcomatous lesion." Seven years after this, there was some difficulty in opening the mouth; examination showed a fullness of the maxillary bone on the right. Roentgenograms showed "deep in the right orbit, there is a dense mass of calcium of uniform density rather suggestive of an osteoma. The lateral wall of the orbit is involved in the process and there is increased density of bone of the zygomatic

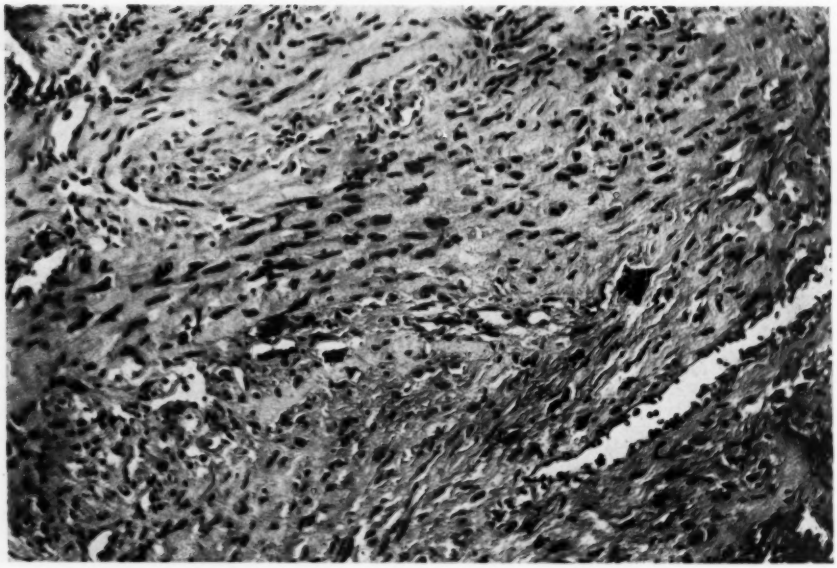

FIG. 3—Case 1, fibrosarcoma, showing spindle cells and abnormal nuclei.

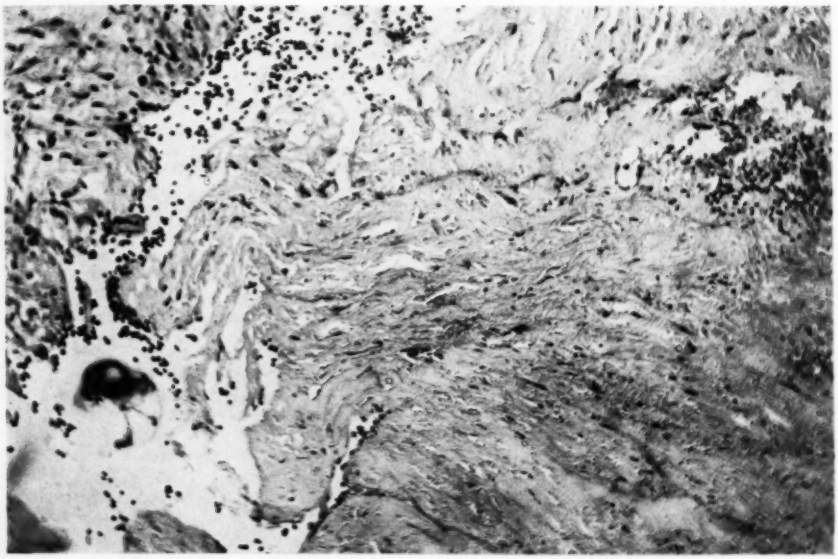

FIG. 4—Case 1, fibrosarcoma. Section shows collagen content of the tumor.

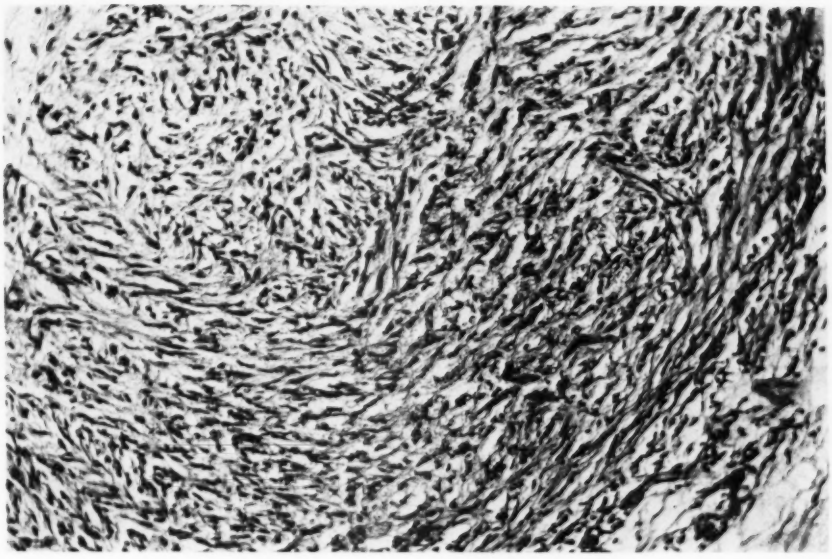

FIG. 5—Case 2, fibrosarcoma. Section demonstrates spindle cells.

process of the frontal and also of the zygoma. The process involves the bone, extends to the right temporal fossa and down to the bone of the maxilla and the antrum . . . ." The patient died seven years after this without further treatment.

Pathology

An epidermal layer surrounds a mass comprised of spindle and stellate cells and collagen fibers (fig. 5). There is moderate pleomorphism and a few multinucleated giant forms are present. An occasional area of herringbone arrangement is noted. The tumor is moderately invasive and there is no encapsulation. Armed Forces Institute of Pathology consultants "found it impossible to make an unequivocal diagnosis" from the material available.

Diagnosis: Fibrosarcoma, postradiation.

CASE 3

The patient was first seen at the age of 4 months. She had never been able to "focus" the left eye, and this eye had been getting larger for one month. Examination showed bilateral retinal detachment with elevation of the tension of the left eye. This cornea was steamy, and there was a yellowish reflex from within the eye. A clinical diagnosis of retinoblastoma was made, and the left eye was enucleated. Pathologic examination substantiated this diagnosis, and radiation was carried out to the right eye to a "16,000 total" (presumably 8,000r x 2). At the age of 20 months the right eye was enucleated because of "recurrent retinoblastoma." This recurrence was first recognized when, following radiation, the vitreous cleared sufficiently to permit view of the fundus.

At the age of 6, a growth was noted for the first time over the bridge of the nose and near the inner canthus of the left eye. Roentgenographic studies failed to reveal any bony abnormality. However, because of continued growth, this mass was biopsied and diagnosed histologically as fibrosarcoma. It was excised and a pedicle graft from the forehead was begun. Further studies raised the possibility that it could be an osteogenic sarcoma. It was felt that a wider incision was indicated, and this was done. The re-excision included the margin of the previous excision, a portion of the left frontal bone, the left supraorbital ridge in its medial aspect, exposure of the left

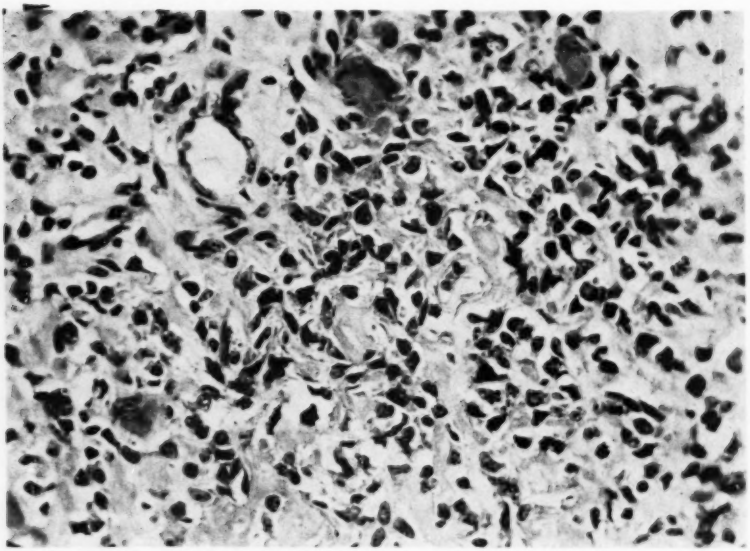

FIG. 6—Case 3, osteogenic sarcoma. Note large nuclear forms.

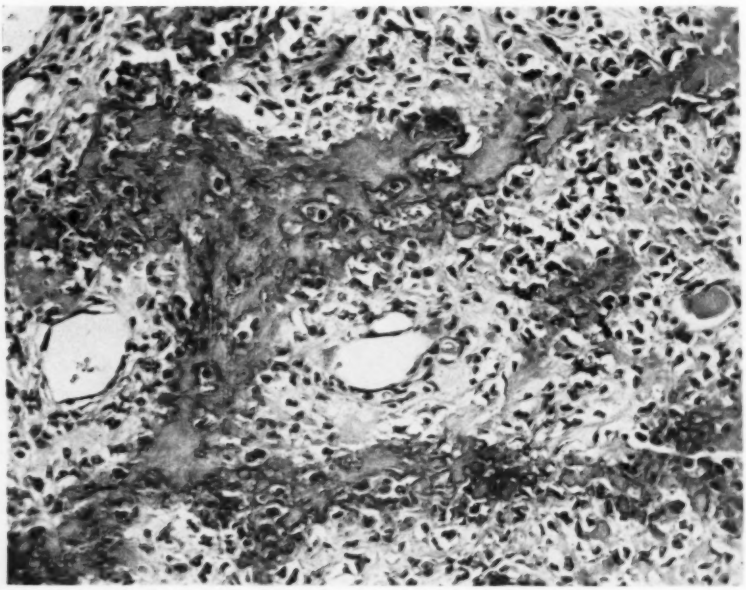

FIG. 7—Case 3, osteogenic sarcoma. Section shows osteoid formation.

frontal sinus on the left, complete excision of the left nasal bone, a portion of the right, of the inner canthus of the left eye, exposure of the ethmoid sinuses of the left antrum with excision of the medial portion of the left maxilla. The pedicle graft was completed.

The patient made a satisfactory convalescence, but when next seen five months after operation, there was evidence of a recurrent lump over the left medial maxilla. This had been present for about a month, and the patient complained of nosebleeds from the left nostril.

The patient was admitted to a hospital. Examination showed a lateral anophthalmos and a large forehead flap swung over the left nose. The orbits were clean and there was no evidence of tumor in the sockets. There were roentgen radiation changes in the skin. The nasal alae were full of granular hard fibrous-appearing tissue, which is clinically tumor. There was no evidence of any spread into the orbital septum or into the posterior segment of the orbit that now remains.

The child was operated upon. With cautery and sharp dissection, the large fibrous tissue mass from the nasal frontal maxillary region, which had previously been described as not penetrating into bone, was removed and a good tumor margin was thought to have been clinically obtained. The pathologic report was *osteogenic sarcoma*. The patient apparently did well following surgery.

She was re-admitted to the hospital a month later with some questionable recurrent mass or granulation tissue in the identical area, the left nasal alae being the predominant site. She was taken to the operating room and once again tumor mass was found and excised from this region. The pathologic report was *recurrent osteogenic sarcoma of the face*. The patient apparently withstood the second procedure fairly well and was discharged from the hospital to return to her home, where she was doing fairly well. However, the mother wrote that the child became very weak, tired and in extreme degree of lassitude and lack of interest in food. She died very quietly in her sleep.

Roentgenographic reports showed the lungs to be clear. Roentgenograms of the skull revealed "a large mass in the nose on the left extending backward and under the left orbit. We are not certain about destruction in the left antrum but at this time it shows marked clouding."

Pathology

Dr. Lorenz Zimmerman reports as follows: "This one available slide does contain a large representative segment of the tumor. The neoplasm presents a variegated appearance. In many areas it is highly cellular, while in other areas the cells are separated by abundant matrix which varies from atypical cartilagenous type to calcifying osteoid. Even in the relatively cellular areas, many tumor cells do seem to be elaborating an abundant eosinophilic matrix (osteoid). The cells vary considerably in size and shape, and the number of mitotic figures also varies much in different areas. Generally, however, in the more cellular areas, the nuclei are relatively large and hyperchromatic, while in the areas where there is an abundant cartilagenous stroma, the cells appear to be more shrunken. Many large vascular channels are present throughout the tumor and there are a few small areas of hemorrhagic necrosis. The diagnosis is osteogenic sarcoma." (Figs. 6 and 7.)

Diagnosis: Osteogenic sarcoma, postradiation.

Case 4

This patient's right eye had been removed for retinoblastoma at the age of 1.5 years. A tumor had become apparent in the left eye at the age of 3. Examination showed anophthalmos on the right with no evidence of disease in the socket. In the left eye, protruding from almost the entire nasal portion of the fundus, there was a large mass of retinoblastoma. There appeared to be some calcium, and the mass was avascular and white. In the temporal portion of the retina at the equator, there was another small focus about one disc diameter in size. There were many daughter areas floating in the vitreous so that a clear view of the remainder of the fundus was not obtained. The lens was clear. There was no evidence of glandular enlargement or bony nodule indicating metastasis. Although the condition of the eye did not seem to be favorable for roentgen treatment, because of the wishes of the parents this treatment was carried out. The factors were 220 kilovolts; 20 milliamperes; 50 cm. target skin distance (T.S.D.) 0.5 mm. cu + 1.0 mm. Al filter; 2.5 cm. temporal portal and 2.0 cm. nasal portal; 400 r per treatment. Treatments were given alternately to the left temple and to the right nose for a total of 800 r through each portal.

Six months later, it was noted that the large number of daughter areas in the vitreous and the primary site appeared to be regressing. It was noted that this case, that had been unfavorable from the beginning, now showed satisfactory regression. Further examination showed continued regression. A year and a half after treatment, examination showed no evidence of any skin changes over the exposed areas. Further observation at intervals showed vitreous to contain many masses which appeared to be fragmenting tumor. The original tumor nasally was well calcified but there were new masses at the posterior fold. Enucleation of the left eye was advised because of recurrent disease.

Four years after treatment, the patient had several hemorrhages from the right side of her nose. Nose examination revealed redundant tissue in the right nose which was excised for biopsy. The tissue appeared to be attached to the right upper lateral wall of the nasal pharynx by a ribbon-like strand of tissue and tissue was also removed from the right orbit. Roentgenographic studies indicated "the right orbit to show increased soft tissue density and apparent thinning of the nasal wall and the floor. The adjacent cavities (the ethmoid cells, the antrum and the nasal fossa) are densely clouded as though occluded by soft tissue." There was difference of opinion about any evidence of bony destruction.

The patient died five years after treatment in a state of emaciation. Autopsy showed osteogenic sarcoma which had invaded both orbit, frontal bone and ethmoid plates and sphenoid bone. The nasal septal bone was replaced by tumor. The brain had been invaded in the anterior portion of the left cerebral hemisphere and the right frontoparietal lobe.

Pathology

Specimens of the tumor show highly invasive elements infiltrating normal tissue. In some areas, the tumor is comprised of densely packed spindle cells with scattered areas suggestive of osteoid. The most conspicuous feature of the tumor is the presence of a tremendous number of bizarre multinucleated giant cells. This suggests the radiation effect in which the nucleus divides but the cell is unable to do so. This is a highly vascular tumor in which red blood cells and hemosiderin are conspicuous. The tumor resembles the malignant giant cell tumor of bone (fig. 8 and 9).

Dr. Lorenz Zimmerman reported as follows: "The tumor, therefore, is a mixture of osteosarcoma, chondrosarcoma, malignant giant cell tumor, and liposarcoma."

Diagnosis: Osteogenic sarcoma, postradiation.

CASE 5

At the age of 8 months in June, 1943, the patient was admitted to Memorial Hospital in New York City. At the age of 3.5 months, there had been "flashes of transparency" in the right eye and this eye was enucleated.

In the left fundus, just lateral to the disc and more below the horizontal rim than above, was a slightly elevated grayish poorly demarcated area about 3 disc diameters in size. No areas of calcium were seen. There was one hemorrhage on the surface. The lesion involved the macula. The vitreous was clear.

Using 250 kilovolts at 25 milliamperes, 1.5 mm. copper filter, 60 TSD; 2.5 cm. cones, the left temple and the right nose were exposed, using 400 r per treatment, twice weekly, to a total of 8000 r to each portal.

A month later, the lesion in the left macula appeared to have satisfactorily regressed. A year and a half later, the lesion had not progressed but there was a hemorrhage on its surface which was thought to be secondary to radiation. A few months later, the hemorrhage had increased in size but it later resorbed. Three years after treatment, it was noted that the growth appeared to be completely arrested and was reduced to a solid mass of calcium.

A year after this, the lesion appeared to be unchanged but there were still some red blood cells. The details were not absolutely sharp because of lens changes in the posterior cortex. After another year, the lesion was unchanged and some hemorrhages were still present; the child was getting along satisfactorily. Five years after treatment, there were described 4-plus skin changes in the treated areas and a saddle nose. The vision was 20/80 and the lens changes had continued to increase, but there was no change in the fundus. Ten years after treatment, severe skin and nose changes were noted and the vision was 5/200. The lens changes had increased and there were no details of the fundus seen. Two years later, the patient was generally doing well and was able to saddle and ride her own horse. Examination showed a slight increase in the cataract but it was not felt that cataract extraction would improve vision. In the right nostril, there were occasional nosebleeds and consideration was given to repair-

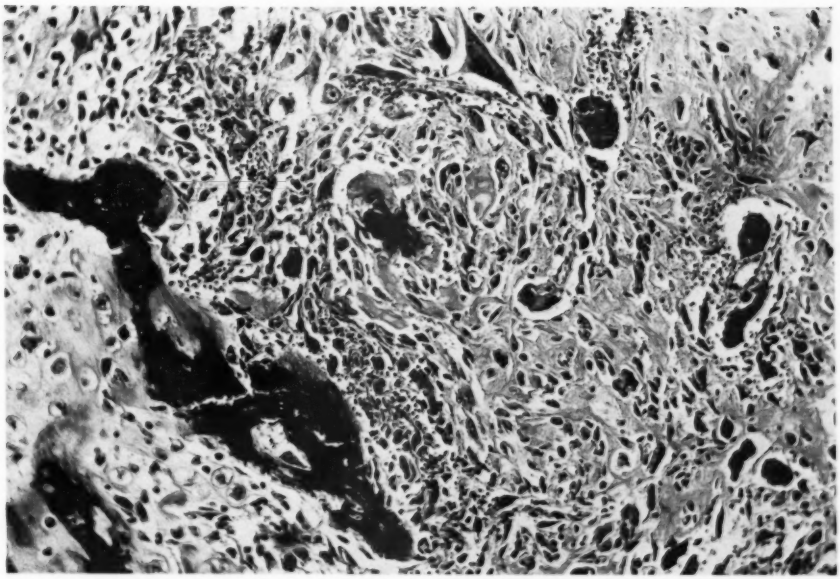

FIG. 8—Case 4, osteogenic sarcoma. Many abnormal nuclear forms are evident.

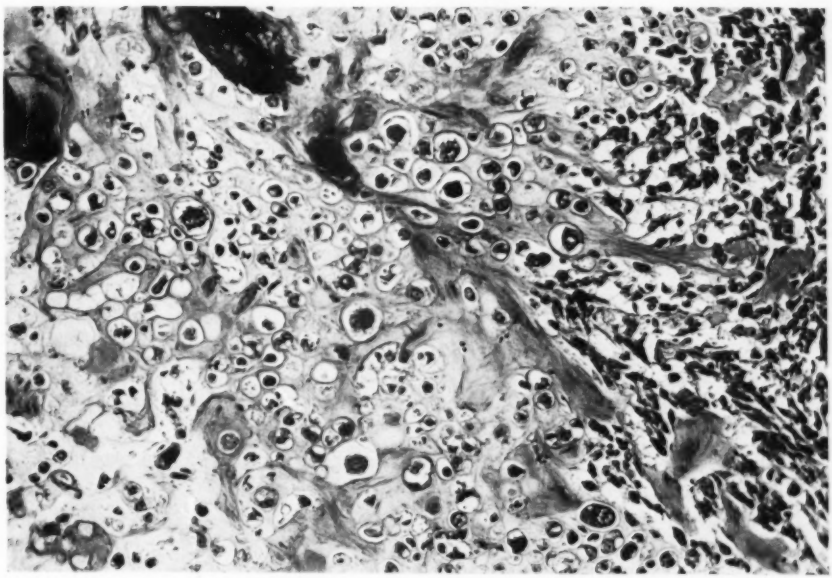

FIG. 9—Case 4, osteogenic sarcoma. Bone formations.

ing the cosmetic defects of the nose and skin. Reconstructive surgery was performed thirteen years after radiation.

A polyp was removed from the right nostril fifteen years after radiation and pathologic examination revealed a malignant mesenchymoma. Roentgenographic studies of the skull and face showed extensive destruction of the walls of the right antrum, the floor of the nose, and of the orbit (fig. 10). Roentgen ray

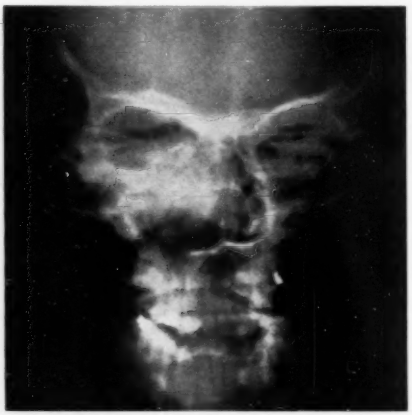

FIG. 10—Case 5, mesenchymoma. Large soft tissue mass in right nasal cavity, extending into right antrum and eroding bone in all directions, displacing nasal septum to left.

treatment was directed toward the right orbit and the patient received two courses of roentgen therapy but died a year later of the tumor which had extended locally and into the brain. There were no evidences of metastasis in lungs or neck.

Pathology

Specimen consists of a tumor covered by epithelium of the nasal cavity. The mass is highly cellular; many cells are spindle shaped. Foci of osteoid are present, and scattered giant cell forms resemble the cells of muscle origin. In one area, there is a focus of palisaded spindle cells which are different from the remainder of the tumor and suggest a neuroepithelial origin (figs. 11 and 12).

Diagnosis: Mesenchymoma, postradiation.

CASE 6

At the age of 2 months, the left eye was enucleated and five months later, a retinoblastoma of the right eye was diagnosed. This eye was treated with radon seeds for one week, with the doses calculated at 7500 r. Two years later a new retinal lesion was seen, and four additional radon seeds were inserted, with a calculated dose of 6500 r.

The child generally did well, although vision was limited to counting fingers at one foot. Seventeen years after treatment, she complained of a scratchy sensation in the right eye with a questionable loss of vision. Superficial keratitis was noted. A week later, the patient complained of headache and had a "blacking out" spell. The cornea improved on local medication, but a month later, a mass was noted along the temporal wall of the orbit.

Roentgenographic examination showed: "there has been asymmetrical development of the orbit; that on the right being deformed slightly by atrophic bone. This is apparently associated with previous roentgen irradiation. The bone in the upper lateral border of the orbital margin on the right is less dense than that on the left, with somewhat thinner cortical bone and poorer delineation of the bony margins. This probably represents bone atrophy. It does not present the appearance usually associated with invasion of bone by neoplasm or metastasis. The orbital apices are, likewise, asymmetrical, but the optic foramina are not abnormal. No frank bone destruction is shown. There is, likewise, diminution in size of the right maxillary sinus, as compared with the left. There is thickening of the mucosa along the inferior and lateral walls of the right maxillary antrum; this may be inflammatory or may represent polypoid change, or a mucocele. The most likely possibility is a polyp. The other paranasal sinuses are clear."

A biopsy was made shortly thereafter, and the diagnosis was *undifferentiated sarcoma*. Exenteration was performed a week later, but the tumor appeared to extend through the intraorbital foramen and optic foramen. The orbit healed in two months without grafting. Two courses of deep roentgen radiation were given.

Four months after operation, severe headaches began and the patient failed rapidly, dying a month later. At the time of death, the orbit was clear but there was evidence of thickening in the temporal wall of the orbit.

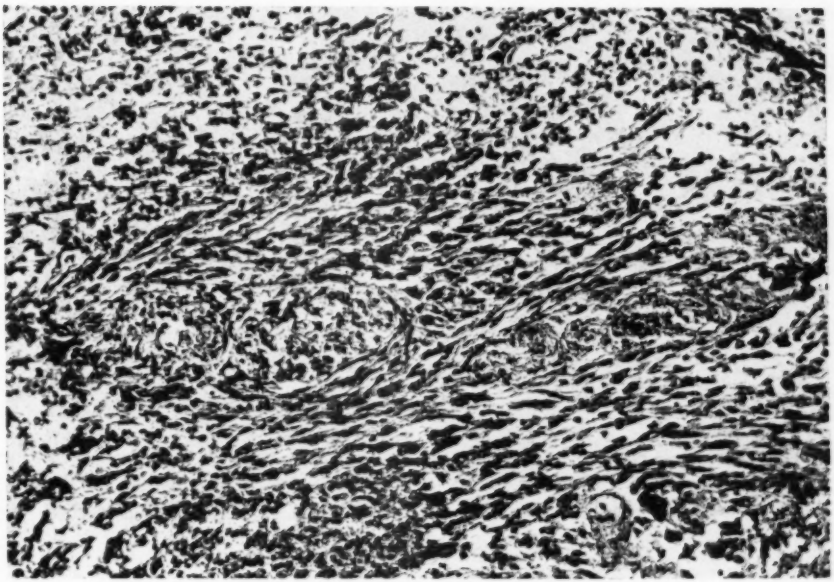

FIG. 11—Case 5, mesenchymoma. Many spindle cells.

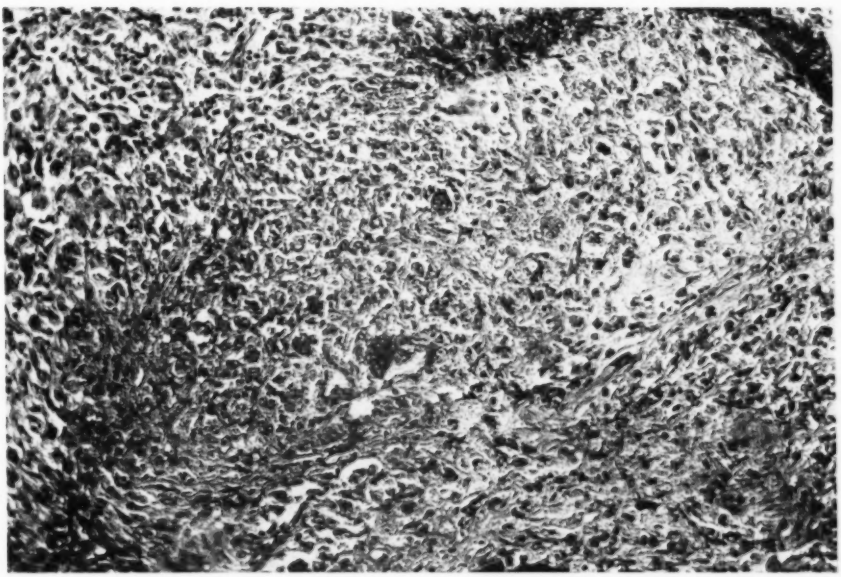

FIG. 12—Case 5, mesenchymoma. Section shows osteoid formation.

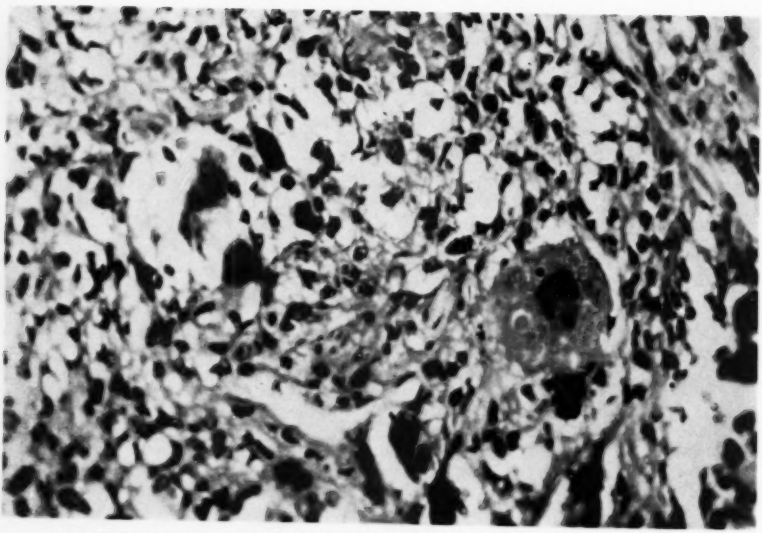

FIG. 13—Case 6, undifferentiated sarcoma. Prominent are bizarre giant cells.

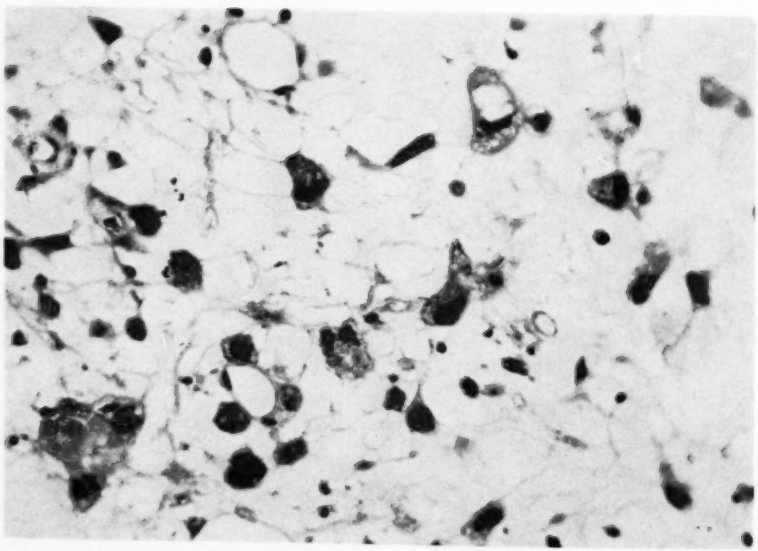

FIG. 14—Case 6, undifferentiated sarcoma. Many cells contain vacuoles, probably of lipoid.

Pathology

Specimen consists of a highly invasive tumor of loose myxoid reaction. Prominent are bizarre giant cells, many of which contain vacuoles, probably of lipoid. Many of the nuclei are densely staining, appearing nonvital as if degenerating, a pyknotic phenomenon seen in liposarcoma (figs. 13 and 14).

Diagnosis: Undifferentiated sarcoma, postradiation.

CASE 7

At the age of 10 months, the right eye of this patient was enucleated for retinoblastoma. Three months later, a tumor was found in the left eye and the patient received 8000 r at each of two portals to the left eye in a period of four months. The lesion appeared to be arrested until two years later, when there was hemorrhage into the vitreous and elevation of tension. Iridencleisis failed to control the tension, and the eye was enucleated in the same month. Pathologic report showed no living tumor cells and it was felt that the eye was lost because of secondary radiation effects.

The child grew normally, but had some difficulty in wearing an artificial eye in the left socket. Seven years after treatment, consideration was given to plastic surgery, but this was not carried out because of the radiation changes. Four years later, a swollen red tender mass appeared in the region of the left lacrimal sac, but this mass spontaneously regressed. A plastic conformer was inserted after a minor plastic procedure several months later. An incision was made into the area which had been swollen and inflamed. Instead of encountering an infected lacrimal sac, firm grayish-white tissue was met which grossly appeared similar to that seen when squamous cell carcinoma is encountered infiltrating soft tissue and bone. Tissue was removed for biopsy. Roentgenographic examination showed "the superior medial margins of both orbits to be obliterated. In addition, the frontal sinuses bilaterally are obliterated and there is a large radiolucency, more pronounced on the left than the right, involving the frontal table over the sinuses (fig. 15). This presumably represents the extent of recurrence of tumor which appears to be enlarging and exerting pressure erosion rather than actual invasion . . . a large projection in the nasopharynx which presumably represents extension of tumor, possibly through the ethmoids into the nasopharynx. . . . There is enlargement of the foramen rotundum and foramen ovale. . . ." Further surgery was considered inadvisable. Metastasis to cervical lymphatics and then generalized tumor developed and the patient died.

FIG. 15—Case 7, carcinoma. Roentgenogram demonstrates extensive destruction of frontal bone.

Pathology

Specimen consists of muscle and connective tissue infiltrated by masses of epithelial cells with a generous connective tissue reaction which includes bone formation. The epithelial elements, contain round and oval nuclei with some hyperchromatism and a few mitotic figures. Many vacuole spaces are present (fig. 16).

Diagnosis: Carcinoma, postradiation.

CASE 8

The patient was first seen at the age of 4, at which time bilateral retinoblastoma was diagnosed. The left eye was enucleated; the optic nerve was not involved by tumor. Radium was applied to the right eye on six occasions in a year and a half. The dose at each treatment was 4000 milligram-hours. Further radium treatment was given on three occasions in the next three years. Each treatment totaled 8000 milligram hours. The original tumor disappeared almost completely, but a posterior cortical cataract had developed

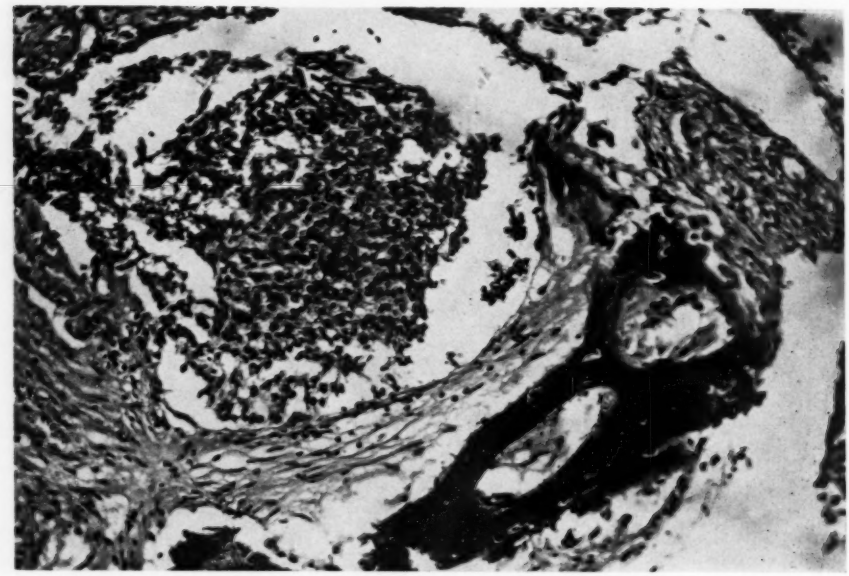

FIG. 16—Case 7, carcinoma. Epithelial cells invading bone.

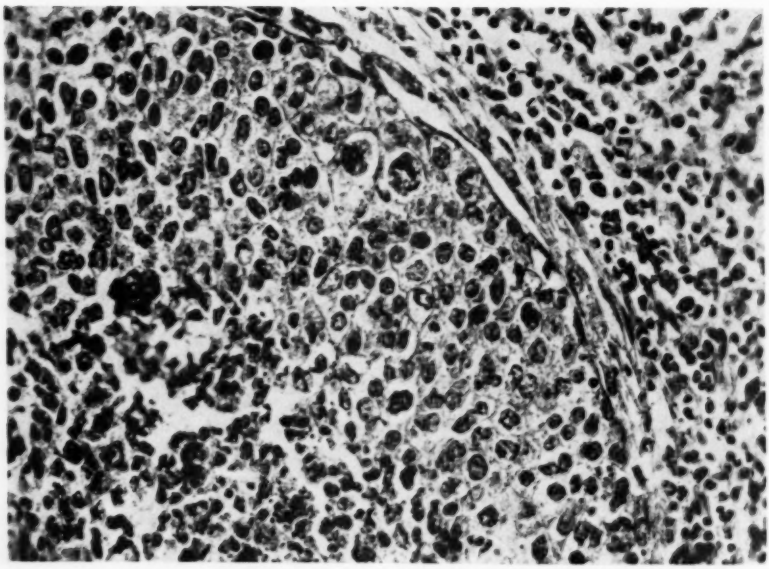

FIG. 17—Case 8, squamous cell carcinoma. Markedly anaplastic cells arranged in perivascular cuffs and bands.

for which a linear extraction was done. Three years after the last treatment, the eye was removed.

The patient returned nineteen years later because of tumor of the left upper lid. A large tumor was found covering the left orbit and involving the left upper lid; another tumor, 1 centimeter in diameter, involved the right upper lid. No roentgenographic report is available. Exenteration of the left orbit was done, and the tumor of the right eyelid was removed.

A year later a node was excised from the left cheek near the ear. This was interpreted microscopically as a lymph-node metastasis of what appears to be a transitional cell carcinoma. Very shortly after removal of this node, another appeared near the lobe of the ear and has been present since. A second node appeared a year after the first one. A radical dissection of the neck was performed, and this material has been diagnosed as poorly differentiated squamous carcinoma.

Pathology

In the specimen from the initial excision, there are anastomosing cords of epithelial cells with nuclei of inconstant shape and size. There are many abnormal giant and multinuclear forms. Although eosinophilic cytoplasm is present, no true keratinization is noted (fig. 17).

In microscopic structure, the tumor of the right eyelid was practically identical with that of the left orbit. Microscopically, it was shown that the tumor had a relatively scanty stroma and consisted predominantly of markedly anaplastic cells arranged in perivascular cuffs and bands, with necrosis and calcareous degeneration of the intervening tumor cells. Generally, the tumor cells have large, round or lobulated hyperchromatic nuclei, usually with well defined nucleoli. Cytoplasm is moderately abundant and, for the most part, stains pale pink with eosin, but no true keratinization can be seen. Mitotic figures are numerous, some showing pathologic forms.

Diagnosis: Squamous cell carcinoma, postradiation.

Case 9

This patient was seen when he was 5 years old, two months after he had fallen down a flight of steps, striking his forehead. His right eye had become blind and painful. Examination showed the tension of the eye to be elevated and the pupil fixed; there was no light perception. A massive intraocular accumulation was seen beneath the retina and choroid. The left eye was normal externally, but there were scattered white deposits in the fundus. Pathologic examination of the enucleated right eye showed retinoblastoma with optic nerve involvement, posterior cortical cataract, anterior and posterior synechia, secondary glaucoma and detachment of the retina. Twelve treatments were given to the eye and the socket, using alternately a lateral port and a directly anterior port; six treatments each to a total of 1200 r to each of the four portals.

Six years after treatment, the left eye was reported as showing considerable mottling of the fundus with lack of retinal pigmentation. The disc was normal. Vision which had originally been 20/20 was now reduced to 20/200 because of lens changes. Four years later, the vision of the left eye had improved to 20/20 following cataract extraction. For a year preceding there had been a tumor 1 centimeter by 1.5 centimeter in the left temple. A punch biopsy at the lower edge showed a basal cell carcinoma of the skin, and the tumor was excised.

Thirteen years after treatment, a lesion in the left temple was again excised; this was also reported as basal cell carcinoma of the skin.

Pathology: Sections show basal cell carcinoma.

Diagnosis: Basal cell carcinoma, postradiation.

Case 10

When this child was 6 months old, a "light reflex" was noted in the left eye. Examination showed a localized retinoblastoma in the right eye and complete detachment with massive tumor in the left eye. The left eye was enucleated and roentgen treatment was started to the right eye. Intramuscular triethylene melamine (TEM) was given, 3100r was given to the skin to each of two portals for a total of 3500 r in the tumor. Two years after initial treatment at the time of a routine follow-up examination, the patient's mother called attention to a small nodule at the inner aspect of the left brow. Roentgenograms showed flattening of bone suggestive of a dermoid. The mass excised, and a year and one half later there was no evidence of recurrence.

Pathology

Specimen is comprised of collagen bundles

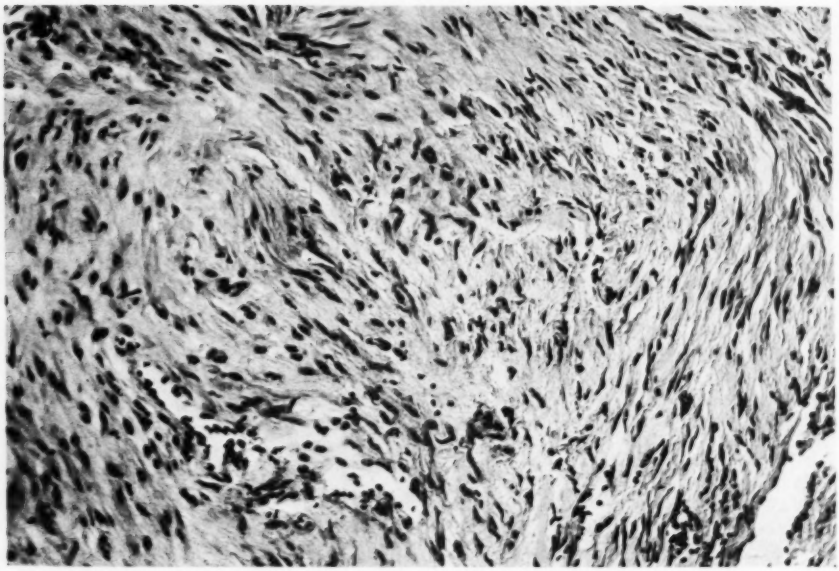

FIG. 18—Case 10, fibromatosis. Spindle cells with fibrous reaction and scattered abnormal nuclei.

with interspersed spindle-cells of fairly uniform shape. A rare abnormal nuclear form with some multinucleated giant cells is present (fig. 18).

Diagnosis: Fibromatosis, postradiation.

II. MISCELLANEOUS EXPOSURES

Although retinoblastoma is the tumor most commonly treated by radiation in the practice of ophthalmology, there are other reasons for exposure of the tissues about the eye. Anderson refers to several cases in which there developed epithelial tumors of the lids following treatment by radiation for eczema.

Ida Mann[10] has reported an unusual case of a meningeal sarcoma which developed following radiation for a glioma of the optic nerve.

In the series reported here, there are included three patients in whom skin lesions occurred following radiation in the area of the eye. The first was a woman who had been exposed to an indeterminate amount of radiation while "preparing radium needles." She had had multiple excisions of basal cell carcinomas from the lower lid and face. The second was a 46-year-old woman who also had had an indeterminate amount of radiation given two or three times weekly between the ages of 18 and 23 for acne. She had had multiple basal cell carcinomas of the lids, for which repeated excisions and skin grafting had been required since she reached the age of 31 years. At age 44, the tumor had extended into the orbit, limiting ocular motility. The right eye was displaced forward and inward, and the lids were fairly well fixed to deeper structures so that exenteration was required.

Perhaps classification as a postradia-

tion tumor is somewhat less tenable in the case of a 60-year-old man who received 4000 r in air over a lacrimal sac, for lymphosarcoma. Six years later a basal cell carcinoma developed in the treated area, and this was successfully excised.

SUMMARY

The data in nine cases from the literature in which neoplasm occurred in the radiated tissue about the eye are discussed. Eight of these patients were treated for retinoblastoma, and one for an optic nerve glioma. Nine patients were reported here who have been treated for retinoblastoma by radiation and who developed malignant tumor. One additional patient, who showed a fibromatous reaction, was also reported. Three patients with skin cancer following radiation about the eye are annotated. The clinical details of tumor behavior and treatment are discussed.

The purpose of this paper is to call attention to the complications of high doses of radiation given in the treatment of retinoblastoma, and in a few instances for other conditions. Malignant tumors have developed in the radiated areas and appeared after latent periods of from four to twenty-seven years. With few exceptions, these have been almost uniformly fatal, usually as a result of bone involvement and intracranial extension. With the advances that have been made in radiotherapy, the radiation dosage has been reduced so that we look forward to the disappearance of these tumors as a complication of the radiation treatment of ophthalmic disease.

ACKNOWLEDGMENTS

I am grateful to Dr. A. B. Reese who has provided his clinical records and pathologic specimens for my study. Dr. L. E. Zimmerman contributed cases from the Registry of Ophthalmic Pathology and assisted in the preparation of the paper.

REFERENCES

1. Auerbach, Oscar; Friedman, Milton; Weiss, Leo, and Amory, Harold I.: Extraskeletal osteogenic sarcoma arising in irradiated tissue, Cancer, 4:1095-1106 (Sept.) 1951.
2. Axenfeld, T.: Doppelseitiges Glioma Retinae und Intraokulare Strahlentherapie, Klin Mbl Augenheilk, 52:426-428, 1914.
3. Cade, Sir Stanford: Radiation-induced cancer in man, Brit J Radiol, 30:393-402 (Aug.) 1957.
4. Cahan, W. G., et al.: Sarcoma arising in irradiated bone; report of 11 cases, Cancer, 1:3-29 (May) 1948.
5. Cruz, Miguel; Coley, Bradley L., and Stewart, Fred W.: Postradiation bone sarcoma, Cancer, 10:72-88 (Jan.-Feb.) 1957.
6. Deller, P.: Fibrosarcoma of the tongue after interstitial irradiation; report of a case, Lancet, 1:1159-1160 (May 26), 1951.
7. Goolden, A. W. G.: Radiation cancer of the pharynx, Brit Med J, 2:1110-1112, 1951.
8. Jayes, P. H., and Dale, R. H.: Sarcoma following X-ray therapy for Graves' disease, Brit J Plast Surg, 4:147-151, 1951.
9. Jones, Arthur: Irradiation sarcoma, Brit J Radiol, 26:273-284, 1953.
10. Mann, Ida; Yates, P. C., and Ainslie, J. P.: Unusual case of double primary orbital tumour, Brit J Ophthal, 37:758-762, 1953.
11. Palmer, J. P., and Spratt, D. W.: Pelvic carcinoma following irradiation for benign gynecological diseases, Amer J Obstet Gynec, 72:497-505 (Sept.) 1956.
12. Petersen, Olaf: Radiation cancer; report of 21 cases, Acta Radiol, 42:221-236 (Sept.) 1954.
13. Pettit, Vernon D.; Chamness, James T., and Ackerman, Lauren V.: Fibromatosis and fibrosarcoma following irradiation therapy, Cancer, 7:149-158 (Jan.) 1954.

14. Porter, C. A., and White, C. J.: Multiple carcinomata following chronic x-ray dermatitis, Ann Surg, XLVI:649-671, 1907.

15. Reese, Algernon B.: Tumors of the eye, New York, Paul B. Hoeber, 1951, pp. 132.

16. Reese, Algernon B.; Hyman, George A.; Merriam, George R., Jr., and Forrest, Arnold W.: The treatment of retinoblastoma by radiation and triethylene melamine, Amer J Ophthal, 43:865-872 (June) 1957.

17. Reese, Algernon B.; Merriam, George R., Jr., and Martin, Hayes E.: Treatment of bilateral retinoblastoma by irradiation and surgery: report on 15-year results, Amer J Ophthal, 32:175-190 (Feb.) 1949.

18. Rowntree, C. W.: Contribution to the study of x-ray carcinoma and the conditions which precede its onset, Arch Middlesex Hosp (Lond), 13:182-205, 1908.

19. Sabanas, Alvina O.; Dahlin, David C.; Childs, Donald S., Jr., and Ivins, John C.: Postradiation sarcoma of bone, Cancer, 9:528-542 (May-June) 1956.

20. Schoenberg, Mark J.: A case of bilateral glioma of the retina apparently arrested in the non-enucleated eye by radium treatment, Arch Ophthal, 48:485-488, 1919.

21. ———: Report on a case of bilateral glioma of the retina, cured in the non-enucleated eye by radium treatment, Arch Ophthal, 56:221-228, 1927.

22. Skolnik, E. M.; Fornatto, E. J., and Heydemann, J.: Osteogenic sarcoma of the skull following irradiation, Ann Otol, 65: 915-936 (Dec.) 1956.

23. Slaughter, Donley P., and Southwick, Harry W.: Mucosal carcinoma as a result of irradiation, Arch Surg, 74:420-429 (March) 1957.

24. Spitz, Sophie, and Higinbotham, Norman L.: Osteogenic sarcoma following prophylactic roentgen-ray therapy, Cancer, 4: 1107-1112 (Sept.) 1951.

25. Stewart, C. B., and Pendergrast, W. J.: Fibrosarcoma developing in heavily irradiated skin, J Med Ass Georgia, 40:24-25 (Jan.) 1951.

26. Stout, A. P.: Fibrosarcoma; malignant tumor of fibroblasts, Cancer, 1:30-63 (May) 1948.

27. Tebbet, Royce D., and Vickery, Robert D.: Osteogenic sarcoma following irradiation for retinoblastoma: with the report of a case, Amer J Ophthal, 35:811-818, 1952.

28. Velhagen, K.: Röntgenbehandlung des Netzhautglioms [X-ray treatment of glioma retinae], Strahlentherapie, 76:442-448, 1947.

29. Wilson, H., and Brunschwig, A.: Irradiation sarcoma, Surgery, 2:607-611, 1937.

30. Zimmerman, Lorenz E., and Ingalls, Raymond: Clinical pathologic conference, Amer J Ophthal, 43:417-426 (March) 1957.

DISCUSSION

WILLIAM F. HUGHES, M.D., Wilmette, Illinois: The author should be commended on being willing to present one of the complications of radiation treatment of those distressing cases of bilateral retinoblastoma.

When such a presentation is made, one is surprised at the number of isolated cases of similar complications which other ophthalmologists have seen. I recall two or three cases in my own experience.

Since malignancies secondary to radiation may appear elsewhere in the body, from six to fifty-six years after treatment, with an average of about twenty-five years, the eventual incidence of radiational tumors following treatment for retinoblastoma may be much higher than the 5.6 per cent reported thus far by the author for patients followed more than four years.

It would be ironical if most of these children with bilateral retinoblastoma later succumbed to the radiation treatment which originally saved them, and more than a little tragic for the parents to experience these tribulations for a second time.

Because radiation is still being used in one form or another with or without chemotherapy for bilateral retinoblastoma, it is important to determine what dosage of radiation might be curative in a high percentage of cases without undue risk of producing a secondary malignant lesion.

There are no such data available for retinoblastoma.

Since skin, mucous membrane, bone, and other structures of the orbit are exposed during such treatment, one can turn for informa-

tion to other areas with similar tissue which have been irradiated.

Excellent reviews of this subject have been published by Tullis in 1958 and Hasterlik in 1960.

Radiational cancer of the skin probably does not occur with doses less than 1500 r. The induction doses usually average near 3000 r. Severe chronic radiational dermatitis almost always follows 4000 r or more, characterized by increasing atrophy, fibrosis, and vascular occlusion. In 20 to 30 per cent of such areas, either squamous or basal cell carcinomas develop eventually.

A total of 20 cases of radiational carcinomas of the mucous membranes, mainly of the respiratory tract, have been reported up to 1957 (Holinger and Rabbett, 1953; Slaughter and Southwick, 1957). Fifty cases of radiational bone sarcoma had been reported by 1957, in tumor doses ranging from 1,400 r to 10,000 r given in single or repeated courses spread over periods up to three years, with latent periods of three to thirty years and an average of ten years.

It is probably that children are more susceptible than adults to the late effects of radiation.

About 20 per cent of all thyroid cancers in children have had a history of irradiation of the thymus in doses as low as 200 to 700 r, and the incidence of thyroid cancer in those previously irradiated is higher than in untreated siblings or the general population.

How do these data apply to the methods now being used for the treatment of retinoblastoma?

It appears that about 3500 rad tumor dose is necessary to destroy most retinoblastomas.

Even if a reduced tumor dose of 3250 r is given by the temporal and nasal ports, according to the most recent Martin-Reese technique, combined with triethylene melamine (TEM), this requires a skin dose of approximately 2800 r in each area. This is well within the dosage range which can produce late malignant lesions of skin, mucous membranes, or bone. This dose is well below that used in cases reported today; viz., 6000 to 8000 r to each port, and may result in a tolerable incidence of secondary malignant lesions.

However, in one of the reported cases, the patient developed a basal cell carcinoma of the skin temporally, where only 1200 r had been given nine years previously.

The use of high voltage roentgen therapy from the betatron, which has little superficial absorption, should reduce the incidence of secondary skin cancers at the site of entrance of the beam, but the exit dose is rather high.

Radon needles or cobalt^{90} discs on the sclera directly over the site of the localized retinoblastoma produce less radiation to the orbital structures and especially the skin, but are less suitable than roentgen therapy for retinoblastomas of multiple origins in the retina or those which have seeded out into the vitreous.

For localized nodules of relatively small size, diathermy or photocoagulation would eliminate the possibility of late radiational malignancy.

With the distressing information provided by our essayist today, these alternative methods of treatment should be kept in mind for localized tumors to avoid undue roentgen-ray exposure of the skin, mucous membrane, and bone, which might result in excessive numbers of late secondary lesions.

DR. FORREST: At each one of the annual meetings of this Academy, progress in ophthalmology is reported; similar strides are being made in radiotherapy. While Dr. Hughes and I are talking about treatment with 220 kilovolts, the radiotherapists are going ahead with their betatron and other high-voltage therapy. They have added the use of a special technique in which the patient is completely surrounded by pure oxygen under several atmospheres of pressure. This has increased the radiosensitivity of tumors.

The use of the betatron has indeed increased the exit dose; on the other hand, it has also permitted a more precise localization, since the physical characteristics of the high-voltage beams are such that the desired area can be treated more sharply.

We would have continuing concern about post-irradiation cancer, but I like to think that with some of the further improvements in method which are being used by radiotherapists, there will be a further decrease and perhaps disappearance of this iatrogenic disease.

MOTILITY COMPLICATIONS IN BUCKLING PROCEDURES

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COMPLICATIONS in the field of motility following operative procedures for detachment of the retina are well known to the profession. It is the purpose of this paper to review the causative agents of these complications and to add to our knowledge, information derived from changes and improvements in surgical techniques used in retinal detachment. In some detachment procedures the ocular muscles are not detached from their insertions, but most frequently it is advisable for adequate exposure and ease of manipulation to remove one or more of the recti muscles. There is, then, not only trauma to the muscle involved, but considerable trauma to Tenon's capsule at the same time. The amount of damage that is done subsequently to the sclera will determine, to a degree, the possible motor defects that may occur. I am sure all of us can remember lifting a rectus muscle, when it was felt advisable, in order to place diathermy points on the sclera underlying this muscle. One must realize that in so doing we are subjecting the tissues to as much damage as if we removed the muscle and carried out the same procedure. The actual removing of the muscle itself is not the most serious offending factor, and may be less traumatic than working under the muscle. Before the advent of the buckling procedures and tubing, diathermy was often applied in massive quantities to large areas of the sclera until it gave not only the appearance, but also the effect, of being cooked. Serious irritation externally to the globe was responsible in great part for the complications resulting from massive dosage of diathermy. The diathermy in tubing procedures is applied in the trough of the tubing and, therefore, is not re-exposed to Tenon's capsule and the muscles after operation. The fact that the tubing is depressed and the lips brought together by means of implanted sutures produces a certain amount of trauma, and irritation is sufficient to be a definite scar-forming factor. In certain specific methods of scleral depression, where nothing more than a flat depressant substance is used, bringing the sclera together over this point would appear to be the least likely to produce ocular motor imbalances following surgical procedures of this type. This is particularly true when the implantation lies between muscle areas.

If we turn to the causes of complications following any form of detachment surgery, it is obvious that we must direct our attention to scar formation as the greatest single factor, if not the only factor, involved in the problem. The conjunctiva, Tenon's capsule and episclera are unique structures unlike any set of tissues elsewhere in the body with similar relationships. We know that there is great variability in the scar formation between individuals and in different areas in the same individual. What determines the quality, as well as quantity, of tissue fluids that result from trauma or irritation lies in the field of theory. The final state of permanent scar has been studied by many investigators.

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They have tried to determine the cause of severe scarring in individuals and have given particular attention to keloid formation in highly pigmented individuals. No totally satisfactory reason has been brought forward.

When buckling procedures became popular, particularly those using various forms of tubing or scleral depressants, the various institutions using these procedures suggested that extraocular motor difficulties could be avoided if the muscle which had been dissected for exposure purposes were reattached 3 mm. from its previous point of attachment. It is difficult to believe that one can follow any routine method of recession of a muscle under all conditions. We feel that it would be wise to consider the justification for this 3 mm. recession in all instances. In the first place, when a scleral buckle, either using tubing or not using a tube, is placed in the sclera some distance back of the insertion of the lateral rectus muscle, for instance, and the muscle is then reattached at its previous point of insertion and made fast, if considerable scar formation takes place, the muscle will become bound down at the point of the scleral buckle. It will then function from this point, as far as rotation is concerned, from this time onward. This would then limit the possible degree of turning to the point of attachment between sclera and muscle. The fact that the muscle is receded would reduce the amount of muscle involved in the scarified area, but it would also weaken its action at the same time. This would seem to be an attempt to cure one mistake with an even greater mistake. The fact that this procedure worked adequately on a number of occasions is mute evidence of the fact that in ordinarily sound binocular fusional capacity, even if a muscle is receded, the involved individual can overcome the defect despite the weakening of the muscle power. If, on the other hand, we could prove that the scleral buckle raises the scleral surface in a definite area, thereby increasing the curvature of the globe at this point, there is some justification for the recession. However, in the majority of instances it is difficult to prove that the sclera has been raised in the area of the scleral resection and, therefore, a routine 3 mm. recession is not justified. It, therefore, would become evident that the point at which scleral resection was to be carried out in its position on the globe, whether far posterior, meridional or in the anterior segment, would determine to a great extent what should be done with the individual muscle. The degree of scleral damage that is done will determine whether a muscle should be receded at the time of operation or not. When we compare the more recent methods of surgery to the over-all diathermy procedures, where great areas of the sclera were treated with varying degrees of electrocoagulation, it is obvious that the limited degree of scleral diathermy cuts down, to a certain degree, the amount of scar tissue to be expected.

Very frequently in the buckling procedures, it is considered advisable to bury the tubing in perhaps one third to one half of the globe and to carry the tubing around the remaining circumference of the globe in the same meridian in order to get the fullest effect of depression from the tubing. Although no difficulty may arise in the area where the tubing is buried, some complications may occur on the opposite side of the globe where the tubing is carried around. If the tubing is not properly fixed to the sclera in this area, it is likely to move forward postoperatively, pulling up under any of the recti muscles under which it has been passed. This deformity has the effect of shortening the effective thrust of the muscle involved. As an illustration of this: a buckle is placed

and depressed into the sclera on the nasal half of a globe. The medial rectus muscle is replaced and receded 3 millimeters. The tubing is carried around the temporal side of the globe and is not firmly implanted in the sclera. Postoperatively, the tubing moves forward, shortening the effect of the lateral rectus and simulating a tucking of this muscle. At the same time the recession of the medial rectus has weakened convergence; divergent strabismus results. The question arises: When scleral tubing must be placed near the area of the insertion of either the superior or inferior oblique, will serious injury at the insertion affect the muscle? Actually injury at the insertion will cause little permanent defect. However, considerable trauma in the area just beyond the insertion of the muscle and underlying the muscle will be far more effective in producing a motor anomaly than any effect produced at the insertion itself. It is, of course, quite infrequently that tubing has to be placed so far posteriorly in the globe, and it is possible ordinarily to get around this problem. It is also quite easy to understand that small horizontal defects are better tolerated by the individual than are any vertical defects produced surgically.

The great steps forward in detachment surgery are not the subject of this discussion, but the way in which these affect motility should be considered. The present-day method of surgery allows for rapid ocular remobilization of the individual to a far greater extent than was ever before possible. Following older surgical procedures, many patients were forced to remain at complete rest for a period of three weeks to a month without any motion of the eyes. In fact, great care was taken that there should be no motion of the eyes during the postoperative period. As opposed to this method, today the patient frequently will have binocularity restored within twenty-four to forty-eight hours or, at the worst, four or five days. The effectiveness of the patching in the older method of surgery resulted in total dissociation of the eyes over an extended period of time. In those eyes where only a small degree of fusional capacity existed, fusion could easily be broken up and restored again only with great difficulty. Furthermore, when the eyes are maintained at complete rest in the presence of scar-producing phenomena occurring between episclera and muscle sheath, as well as muscle sheath and conjunctiva, the likelihood of complete fixation of these scars and permanent immobilization is greatly enhanced. In the present methods of surgery, provided the macular area has not been detached for too long a period, the restoration of good central vision shows a far higher percentage than ever was obtainable in the older forms of surgery. Obviously there is less comparison between the various forms of detachment surgery in instances in which the macula has been detached for so long that central visual acuity cannot again be restored. It is also interesting to note, even where perimacular visual acuity is restored with a good replacement of a majority of the retinal components, that a distortion may exist due to a motility imbalance. In other words, the discomfort may arise from a binocularity produced and held by peripheral relationships rather than by a central macular relationship of the two eyes. Of course, complications of this sort can come about in any form of detachment surgery.

I have asked a number of individuals for statistical data related to this subject and am not surprised that I have had varying replies. It is quite evident that a number of forms of motor anomalies have been encountered. The types of anomalies and the degrees of deviation have been as varied as are the motor anomalies that result from other causes.

It would be unjust to attempt to compare the percentage of motor anomalies following the newer methods of detachment surgery with that following the older methods. The consultations that are requested on complications from detachment surgery are declining, which indicates that considerable thought is being directed toward prevention of motor disturbances postoperatively. Certainly our own records would bear out this fact. The most frequently noted defects are horizontal imbalances related primarily to dysfunction of the lateral and medial rectus and due to fixation of the muscle following the surgical procedure. The majority of these are of such small degree that some of them adjust themselves and some become adjusted with some form of minor therapy. Small degrees of vertical imbalance are noted with operative procedures involving the severing of the superior and inferior recti and complications arising from these. Involvement of the inferior and superior obliques has been less frequently reported. The buckling procedures, as well as diathermy in other forms, may result in postoperative fusional difficulties on other than a motility basis. Induced astigmatism may arise from the surgical procedure, which is poorly tolerated at first. This may subside as the scleral wall flattens with passing of time. Some believe aniseikonia may arise on the same basis, but it is more likely to be retinal metamorphopsia, which may or may not persist, depending on the permanency of the scleral wall damage. These factors are mentioned only because they must be considered in the differential diagnosis. The three major causes of muscular imbalance that we have encountered are (1) fixation of the muscle to the globe and/or conjunctiva, or both, as the result of a massive reaction to the surgical trauma; (2) a pulling forward of the tubing, thereby displacing the normal functional directional pull of the muscle; and (3) traumatic injury to a muscle in the area of the nerve supply resulting in total paralysis of this muscle. There is one other defect arising from poor surgical technique which is encountered occasionally. This defect results if the tubing is carried around the globe and under the recti muscle and is pulled around to the opposite side without thought to its position relative to the muscle, and when the attachments between the muscle sheath and Tenon's capsule are not carefully observed. Then the muscle can totally rotate on itself, resulting in shortening or distortion and inefficiency in its action. Occasionally the tubing will be carried over a rectus muscle, causing interference in the normal actions of this muscle in rotations in the extreme position, and a motor anomaly will be encountered in a peripheral position.

Obviously, in all surgical procedures the avoidance of complications is better than the correction, but sometimes it is impossible to avoid the complications. However, knowing what to look for helps us in avoiding the trouble subsequently. One should consider the least possible amount of trauma to the muscles at the time of their dissection and replacement. One should leave as much of Tenon's capsule as possible in its normal position. Avoidance of any scleral damage other than that which is absolutely necessary for the surgical procedure should be a first consideration. A minimal amount of diathermy application and an indication for this application in every instance should be remembered. Rehabilitation of the patient's binocularity as rapidly as is possible under the circumstances should be attempted in all instances. It is quite obvious that the eye should be kept at an optimum state of cycloplegia postoperatively by the use of mydriatics and cycloplegics. However, the interest in our branch of this work also involves the reac-

tions in the subconjunctival space and the reduction of local reactions in this area. This can be helped by the application of cold pack to reduce massive outflow of post-traumatic fluid and the local reduction of the histaminic process by the use of local steroids. In the face of very rapid reactions and in patients with a known proclivity to massive edema following surgical procedures, the use of systemic steroids is indicated. In patients who are likely to scar easily, the use of gel film may be indicated. Frequently postoperative therapy does not require more than the measures mentioned above, but if a definite motor anomaly existing postoperatively causes serious ocular distress, some form of aid must be afforded the patient. A small degree of phoria resulting from surgical procedures can be corrected by prism additions to glasses. However, if the defect is large and increases rather than decreases, a surgical investigation should determine the cause of the discrepancy. In many instances a surgical procedure of this sort will have to be on the basis of predetermined causes, but on occasion all muscles that have been involved will have to be investigated before satisfactory correction can be carried out. The defects resulting from scarring do not respond to surgical procedures as well as those that result from a normal muscular weakness, and greater degree of surgical correction must be undertaken in order to produce a satisfactory end result.

CONCLUSIONS

Analysis of the postoperative motor anomalies resulting from detachment surgery would indicate that the end results, both visual and binocular, have been greatly improved with the advent of the newer technique of surgery. The complications involving a motor anomaly are more obvious because of the better visual acuity resulting from the newer procedures and the necessity for restoring binocularity to individuals when motor disabilities have been produced. It is suggested that no basic routine of recession of a dissected muscle be carried out, but that any replacement be done in accordance with the procedure that is carried out, and that care be taken to preserve the normal function of the muscle capsule, Tenon's capsule and the sclera, wherever possible to prevent scar formation. It is suggested that postoperative care in the prevention of scar formation be undertaken wherever possible and that binocularity be restored at the earliest possible moment. A small degree of motor anomaly postoperatively should be corrected by the addition of prism in the lens correction of the patient, if this is possible, but surgical repair of the motor anomaly should not be avoided if it will restore normal binocular function to the individual.

DISCUSSION

MORTON L. ROSENTHAL, M.D., Brooklyn, N. Y.: Operations on the eye which involve removing one or more extraocular muscles or the handling of them will produce an incidence of motor complications.

Dr. Romaine has suggested some ways to avoid or minimize these. I would like to comment on a few factors that have appeared to be specially significant.

From a point of view of abnormal muscle adhesions, diathermy applied on the bare sclera under a muscle produces the most severe motility complications that I have seen. The muscle becomes firmly bound to a thin scar of sclera along the area of diathermy treatment. A tropia toward the affected muscle invariably results. Further surgery, either for retinal detachment or to overcome the tropia, carries a high risk of rupturing the globe. We therefore always apply diathermy under scleral flaps so that no direct contact of muscle and inflamed tissue can occur.

Scleral buckling operations are designed to produce tumors of inflamed choroid which are so placed as to close retinal holes. No changes in eyeball length are primarily aimed at. If a polyethylene tube, 1 mm. in diameter, is buried, we have found that some slight reces-

sion of the rectus muscle over the area of scleral resection is necessary to prevent a tropia in the direction of that muscle. If a broad implant of silicone is used and buried under scleral flaps, as is now my practice, no recession at all seems necessary (fig. 1). Only one or two recti need be detached, and these are loosely re-attached to their original insertions (fig. 2).

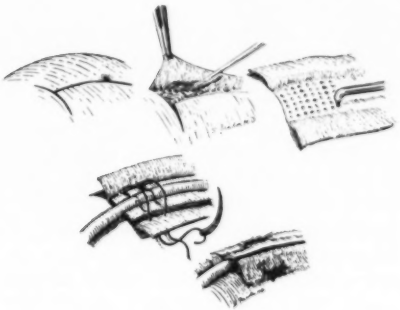

FIGURE 1.

FIGURE 2.

Dr. Romaine has emphasized the handling of the circling tube on the side of the eye opposite to the scleral resection. We avoid complications in this area by passing the tube under the unsevered recti muscles as indicated (fig. 3). No twisting of the muscle is then possible. We also emphasize the value of placing the circling tube on a great circle of the globe so as to minimize any tendency to slip anteriorly or posteriorly. Fixation sutures around, but not through, the unburied tube should be taken in each quadrant (fig. 4).

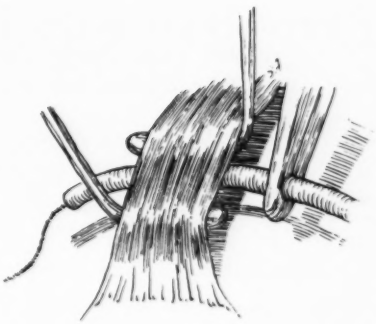

FIGURE 3.

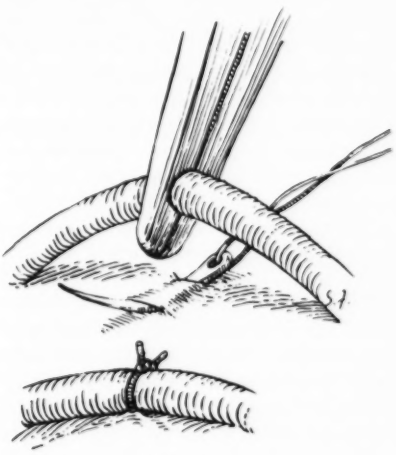

FIGURE 4.

Finally, I should like to add that we have fewest muscle complications in those patients who achieve good visual results. The importance of the fusional mechanism cannot be overestimated, and the encouragement of the patient to use both eyes as soon as possible is essential.

Routinely, now, the dressing on the surgically treated eye is removed within four to five days, or even sooner in some cases.

TWO DEVICES WHICH FACILITATE PHOTOGRAPHY WITH THE ZEISS OPERATION MICROSCOPE
The Photo-Collar and the Photo-Surgical Transformer

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BY INVITATION

THE author's simplified approach to the problem of photography during microsurgery has been employed since August 1959 and has enabled the collection of numerous color slides of otologic surgical procedures. The basic principle of the technique is the utilization of the unaltered optical and illumination systems of the Zeiss Operating Microscope. Pictures are taken with a single-lens reflex camera, using its usual lens, through the microscope eyepiece (transocular photomicrography). The two instruments are combined safely and temporarily, only during photography. Prompt removal of the self-supporting camera from the microscopic eyepiece avoids the need for cumbersome brackets, and preserves an unencumbered and normally maneuverable microscope for the surgeon. Simple self-installation and lack of optical modification avoids the need for expensive factory alteration of the microscope or of the camera. The standard 30-watt microscope lamp in its original housing provides adequate illumination when overvolted temporarily, and used with High Speed Ektachrome film. A comprehensive discussion of the photographic problems and their original solution, and numerous color plates illustrating microsurgical details have been presented elsewhere.[3]

Other otolaryngologists have expressed an intense interest in this original technique, which has stimulated continued investigation leading to the development of the two new devices, the *photo-collar* and the *photo-surgical transformer*. These devices augment the method and form the basis of the present paper. The *photo-collar* is offered as a means of attaching the camera to the microscope and of focusing the picture more easily than before. The *photo-surgical transformer* is designed to provide a more adjustable and controlled illumination source than previously available. Variable illumination for surgical procedures as well as for photography, with either the 30-watt or the 50-watt lamp, is practical with this unit. The technique of their installation and actual use for photography supplements the description of these devices in the following discussion. Several color plates are included to illustrate typical photographic exposures.

THE PHOTO-COLLAR

This device contains no lenses; its purpose is to enable rapid and convenient attachment of the camera to the microscope eyepiece in a way that will not restrict the ability to adjust the focus of the eyepiece. The photo-collar con-

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Presented at the Sixty-Fifth Annual Session of the American Academy of Ophthalmology and Otolaryngology, Oct. 9-14, 1960, Chicago.

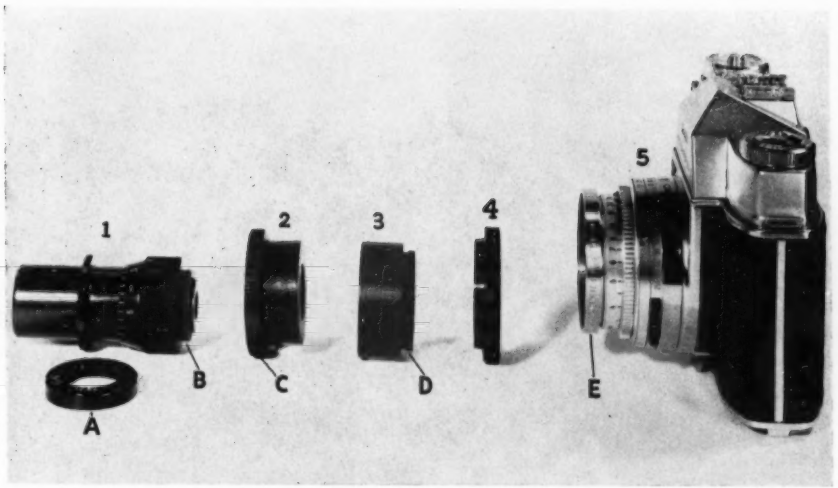


FIG. 1—The photo-collar and its method of attachment to eyepiece of Zeiss operation microscope and to the Kodak Retina Reflex S Camera. (1) ×12.5 standard eyepiece from which the plastic collar (A) has been removed, exposing threat (B); (2) inner sleeve of photo-collar with knurled focusing rim (C); (3) outer portion of photo-collar with proximal series 5 thread (D); (4) series 6-5 step-down ring; (5) single-lens reflex camera with attached series 6 filter adapter ring (E). If collar (2) is slipped over eyepiece (1), it can be screwed into position onto exposed threads (B). Ring (4) is a standard photographic item; its attachment to (E) converts this filter adapter to the series 5 size.

sists of a pair of concentric sleeves made of annodized aluminum. The outer sleeve attaches to any camera as though it were a lens shade, and fits over the inner sleeve of the photo-collar. The inner sleeve is designed for simple attachment to the standard ×12.5 and ×20 ocular eyepieces, as well as the focusing eyepieces of popular observation side tubes.

Installation of the photo-collar is quite simple and can be accomplished by the surgeon in a few minutes. The parts in the order of attachment are shown in figure 1. Each standard ×12.5 or ×20 eyepiece, as well as the focusing eyepiece of the Zeiss, House, and Shea* side tubes, includes as part of the design a uniformly sized plastic collar† (usually bearing the magnification inscription) which can be removed by counterclockwise rotation. The eyepiece is not damaged when this plastic collar is removed. Its removal exposes the threads (fig. 1, B) which are used to attach the inner photo-collar. The inner photo-collar sleeve is attached simply by screwing it onto the eyepiece in place of the plastic collar. The knurled focusing rim of the inner sleeve (fig. 1, C) contains two recessed set screws which fix the inner photo-collar to the eye-

*Although the original Shea side tube could not be independently focused, a new model with a standard focusing eyepiece is now available.

†An exception is the old model ×12.5 eyepiece found in the original wide barreled (30 mm. inside diameter) binocular head. This eyepiece has no removable plastic collar. However, these old eyepieces can be easily replaced with the modern (25 mm.) eyepieces for which the Photo-collar is designed, by converting the old eyepiece tube with special Zeiss inserts.

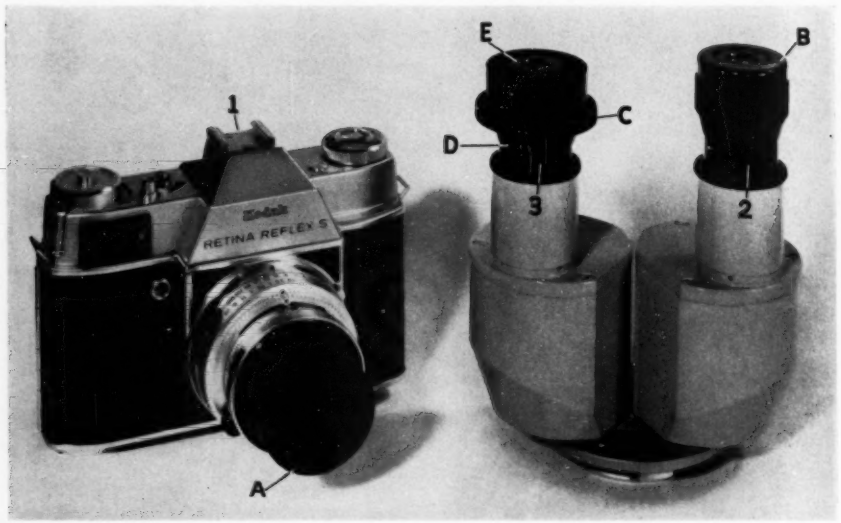


FIG. 2—Completed installation of the photo-collar. Adapted camera (1) with attached outer photo-collar (A). Zeiss operating microscope with unmodified standard ×12.5 eyepiece (2) with removable plastic collar (B) in original position; ×12.5 eyepiece (3) with inner photo-collar attached; knurled focusing rim (C) of photo-collar; (D) focusing marks of eyepiece, (E) lens mounting of eyepiece protruding through opening in photo-collar.

The parts have been assembled as indicated in figure 1. The inner photo-collar does not interfere with microscopic viewing during surgery and remains attached to the Zeiss operating microscope should the occasion for photography arise. When the camera is slipped over the eyepiece, it becomes self-supporting. Although a straight binocular is shown, the technique is equally adaptable to the inclined binocular.

piece after it has been screwed on. Rotation of this knurled rim will turn the ocular eyepiece and change its focus setting in the usual fashion. Thus, without modification of its optics or its essential feature of variable focus, the eyepiece has been provided with a smooth, machined surface.

This smooth surface is designed to accommodate the part (outer sleeve) of the photo-collar which attaches to the camera. The outer sleeve is a cylinder ground to fit over the inner sleeve (or eyepiece) of the photo-collar. At its proximal end, this cylinder is provided with a standard photographic thread of the series 5 size, so that it can be attached to any camera in the manner of a lens shade. Because the screw threads of all camera filter and lens attachments have standard sizes (described as "series 5," "series 6," etc.) the same outer photo-collar can be easily adapted to any existing camera. Filter adapter rings are available in most camera shops. If the ring is of the series 5 size, it will accept the outer photo-collar directly. If the adapter ring is of a different size (as required for the Retina Reflex S Camera) standard step-down rings (fig. 1 (4)), also available in most camera shops, can be interposed between the collar and the camera adapter ring to convert the latter to the series 5 size. The completed assembly of both parts of the photo-collar is shown in figure 2. Note that the lens mounting of the eyepiece (fig. 2, E) actually protrudes beyond the in-

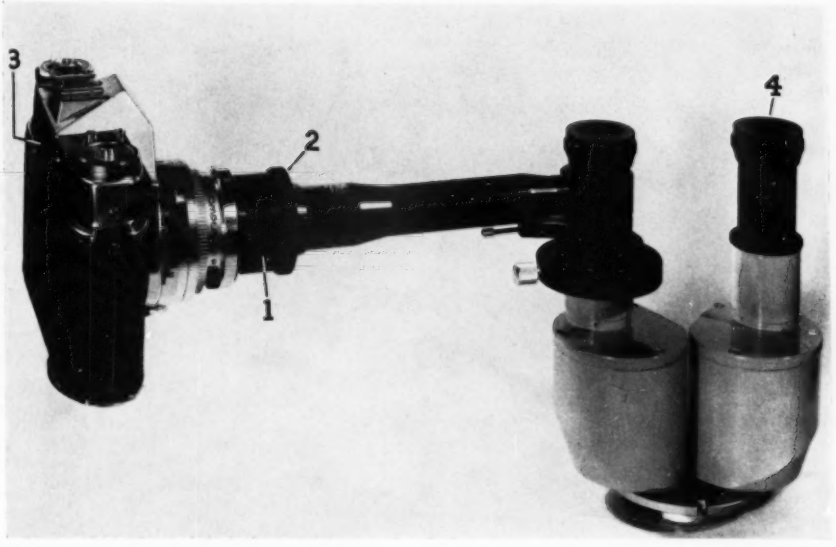


FIG. 3—The Photo-collar attached to the focusing eyepiece of the Zeiss observation side tube. (1) outer photo-collar; (2) focusing rim of inner photo-collar; (3) camera viewer; (4) standard ×10 eyepiece. The focusing viewer of the Zeiss, House and Shea observer side tubes have removable plastic collars (fig. 1, A) and will receive the standard photo-collar. Note that light loss along side tubes limits photographs to the ×6 or ×10 settings. While the camera is self-supporting at the top eyepiece (fig. 2), this is not the case while using the side tube, and the camera here must be hand held or bracketed. The photographer focuses the picture by rotating the focusing rim (2) while looking through the camera at (3). The same method of focusing applies for the setup illustrated in figure 2. The top eyepiece method can be applied here if the ×10 eyepiece (4) is replaced with the modified ×12.5 eyepiece at time of photography.

ner photo-collar, and that the ocular focusing marks remain clearly visible below its focusing rim. The adapted camera can now be attached to the operating microscope simply by placing it over the adapted eyepiece, as illustrated with the side tube in figure 3. The two fit well together but not so tightly as to prevent rotation of the knurled focusing rim. Furthermore, the outer cylinder is of such length that the attached camera supports itself on either the straight or the inclined binocular head, without additional braces.*

THE PHOTO-SURGICAL TRANSFORMER

Unless pictures are being made in a situation where time exposures are permissible, such as in the laboratory (fig. 5) or when specimens are being photographed (fig. 6), a brighter than normal light source is necessary. It is now well established[3] that the standard 30-watt microscope lamp in its normal housing can provide adequate illumination for photography during surgery if it is overvolted temporarily to 6.4 amperes (figs. 7, 8, and 9). This illumination permits exposures of one fifteenth of a second†

*The prototype of this unit was made in the machine Shop of Temple University Medical Center by Mr. Charles Thur, its director. It is now being manufactured by the Storz Instrument Company.

†Under surgical conditions exposure times must not be slower than one-fifteenth second in order to avoid movement.

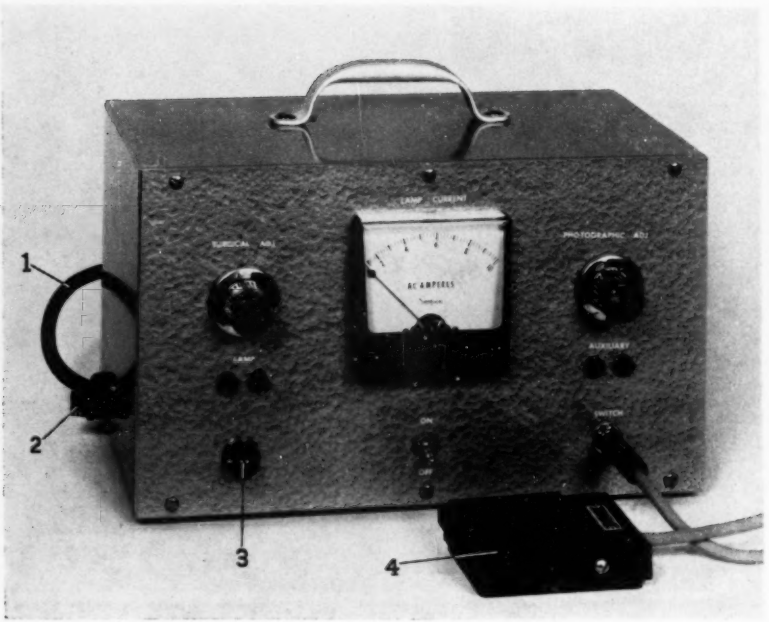


FIG. 4—The photo-surgical transformer: (1) line cord; (2) fuse; (3) neon indicator lamp; (4) foot pedal. The function of the various parts is described in the text. This transformer was built by Mr. George Stewart. The Storz Instrument Company is expected to arrange manufacture and distribution.

at variable magnification settings when the camera is attached as described.

Aside from the need for intensified illumination for photography, there is need for brighter and more variable illumination during surgery than that available with the standard microscope transformer. Furthermore, when finer surgical instruments permit more frequent manipulation under magnification powers of ×25 or ×40, brighter illumination than that in use at present will be needed.

With the foregoing illumination needs in mind, an adjustable power supply and light intensifier was designed with the valuable advice and aid of Mr. George Stewart of the Department of Medical Physics, Temple University Medical Center. This transformer has the following features:

1. Independently adjustable intensities both for observation and surgery as well as for photography.

2. Predictability of variable current output settings based upon readings of a self-contained ampere meter.

3. A remote control foot switch for intensified light for photography, easily operated by the surgeon.

4. Sufficient capacity to operate over long periods of time and to provide illumination by either the standard 30-watt lamp or the special 50-watt

lamp, without rewiring of the transformer.

5. Compactness and light weight.
6. Safe, fused-circuit construction, with accessible standard electronic parts.

It consists of an 11-volt 11-ampere transformer housed in a grounded metal cabinet. A foot-operated relay shifts the current output from the low (surgical) to the high (photographic) current. Both of these ranges can be independently adjusted to provide variable intensity for observation under different surgical situations, as well as a precisely overvolted level for photography.

The photo-surgical transformer is shown in figure 4. The microscope transformer is turned off and the two-pronged plug which leads from it to the microscope post is unplugged and then plugged into the *lamp* outlets instead. It is at these outlets that current to the microscope lamp is provided. An extension cord is provided for this receptacle to enable location of the transformer some distance from the microscope if desired, so that only the small pedal need be underfoot. After the three-pronged line cord has been connected to any standard 115-volt wall outlet, the ON-OFF switch controls the current to the transformer. When power reaches the transformer primary coil, the neon pilot light glows. If the fuse needs replacement, no current reaches the neon light. The lamp current ammeter records at all times the current being drawn by the microscope lamp. Because current rather than voltage is being measured, the lamp must be intact and connected (closed circuit) to achieve a reading. The foot pedal is connected by a long cord and removable plug at the switch. When the pedal is not depressed (normal usage) the lamp current provided is governed by the SURGICAL ADJUST rheostat. Clockwise rotation of this knob increases the illumination of the lamp. The ampere range for the 30-watt lamp during an operation is the surgeon's choice and depends upon his preference and needs. Usually a range of 4.1 to 5.5 amperes is used.

For photography, the PHOTOGRAPHIC ADJUST knob is used to set the illumination intensity; current flows through this rheostat to the lamp outlet only while the foot pedal is depressed. For the 30-watt lamp, a current of 6.4 amperes is recommended. In order to calibrate the photo-surgical transformer for photography, the PHOTOGRAPHIC ADJUST knob is turned completely counterclockwise (0 on the knob). With the foot pedal depressed, the knob is rotated slowly clockwise until the current reaches 6.4 amperes.* The transformer is now ready to deliver the photographic current whenever the foot pedal is held down.

Readjustment of one control knob does not affect the current provided by the other; the two are completely independent of each other even though internally they derive their current from a single transformer. The numbers on the knobs are relative only; absolute values must be determined by the meter, which automatically takes into account fluctuating line voltage. The audible relay which is actuated when the foot pedal is depressed causes, in addition to a shift from surgical to photographic current, an internal connection between the two outlets marked AUXILIARY. This is provided as an automatic switch, anticipating the use of motorized cameras or shutter releases in the future. No current is provided at this outlet.

*If this current is exceeded, bulb life may be markedly shortened or the filament may melt. There have been no instances of explosion of the glass bulb itself even when these limitations have been ignored.

Although the illumination provided by the overvolted 30-watt lamp is adequate, the introduction of a bulb of greater illumination potential than the standard lamp has been eagerly awaited in order to enable wider use of side-tube photography. Recently, several new Zeiss 50-watt lamps have been made available to the author for trial. The Zeiss Company markets a special cord and lamp housing for the bulb as well as a special transformer for use only with this lamp.

The existing transformer in the Zeiss Operating Microscope base is not adaptable to the 50-watt lamp and must be completely bypassed.

Our preliminary photoelectric measurements of light output using this new Zeiss 50-watt lamp have yielded interesting results, which have been confirmed by independent measurements elsewhere.[1] The 50-watt lamps which we have tested will not tolerate the same proportion of overvolting as the standard 30-watt lamp. The 30-watt lamp consistently tolerates a double overload to 61 watts (6.4 amperes at 9.6 volts). The maximum current supplied to the 50-watt lamp by the special Zeiss transformer is 9.5 amperes. If the maximum light output from the overvolted 30-watt lamp is given a value of 100 per cent, then the 50-watt lamp's relative light output set at maximum on the Zeiss transformer (9.5 amperes) yields only 77 per cent of this light. In other words, overvolting the existing 30-watt lamp yields more light than the maximum available from the specially installed 50-watt lamp used with its special Zeiss transformer. On the other hand, further studies are in progress using the photo-surgical transformer to illuminate the 50-watt lamp. The lamp apparently will tolerate a current of 10 amperes for prolonged periods, and in this situation yields 120 per cent illumination by the above standard. Whether this small improvement will result in better exposure is awaiting study. One possible application will be motion picture photography through the Zeiss side arm by the transocular technique, preserving full binocular vision for surgery.* With this eventuality in mind, or in the event that filament characteristics of the lamp may be altered, the photo-surgical transformer has been designed to include the workable range of the 50-watt lamp. Preliminary studies suggest 6.5 to 8 amperes for surgery and 10 amperes for photography.

In summary, this unit provides independently adjustable illumination both for photography and for surgery without photography. This measurable intensity variation will make it possible to adapt the photo-surgical transformer to the illumination needs of new and different films as they appear in the future; its ability to power the 50-watt lamp also increases its potential usefulness. Furthermore, the portability of the photo-surgical transformer makes it valuable as an extra power supply to be used in the dissection room or in other areas where transportation of the microscope base is awkward. The unit, like the microscope itself, is not explosion proof.

INSTRUCTIONS FOR PHOTOGRAPHY

In order to complete this discussion, a brief but adequate description of actual photographic technique will be presented. The color plates are included,

*It is noted with interest that the latest device for motion picture photography manufactured by the Zeiss Company utilizes the transocular principle. A single-lens reflex motion picture camera is mounted on an *optically modified* top binocular microscope head. This is a special factory modification and the extra head can be used only for this purpose, since only one eyepiece remains for the surgeon. The illumination source is the 50-watt lamp and their special transformer.

not to point out details of surgical technique, but rather to illustrate typical exposure values and the versatility of the transocular approach.

A wide choice of cameras can be used, as long as the camera selected is one of the 35 mm. single-lens reflex type. This type is popular and is probably already owned by many readers. Such cameras utilize the same lens for focusing and composition as for photography. This feature assures a sharp picture if the ground-glass viewer image has been carefully focused. The camera is used with its normal 45 or 50 mm. lens, which need not be faster than *f*3.5 or *f*2.8. It is essential to use the camera with its lens in order to retain adjustability of fine focus at the eyepiece or side tube. Furthermore, use of the camera without its lens results in a larger, but less intense, image and in exposure prolongation beyond one-fifteenth second. Because the photo-collar attaches as do other photographic accessories, the camera itself remains intact and easily available for other uses. The Kodak Retina Reflex S, with *f*2.8, 50 mm. lens, illustrated here, is the camera preferred by the author; it is convenient to use and has given dependable results.

The image presented by the eyepiece lens to the camera lens determines the quality of the photograph. Although the camera ground-glass viewer is used to check image focus, the camera focus setting itself is not varied. It is always left at infinity (∞) and focus is adjusted at the microscope as described below. Similarly, because image intensity and depth of field are determined by the microscope lens and lamp system, the camera's lens aperture setting is not changed; it is left "wide open" (lowest *f* number) always. The film used with this technique is 35 mm. *Kodak High Speed Ektachrome Type B*, the fastest color film available. It has sufficient speed to yield good color transparencies with normal processing. Its great latitude permits choice of different magnification settings at the same lamp intensity without changing the exposure time of one-fifteenth second (figs. 7, 8, and 9).

The surgeon is prepared for photography at any time if he has installed the photo-collar, as shown in figure 2 or figure 3, and has a light intensifier available.* The modified eyepiece is kept in place always and is hardly noticed by the surgeon. When pictures are wanted, an assistant locks the vertical hold knob on the microscope stand so that the added camera weight will not grossly change the microscope level. The camera is then slipped on and becomes self-supporting (except at the side tube, where it must be hand held). If $\times 10$ eyepieces are used† (and until a special inner photo-collar for this eyepiece becomes available), the one not attached to the side tube (fig. 3 (4)) is temporarily unplugged. In its place, the extra $\times 12.5$ eyepiece, with all the parts shown in figure 1 attached, is plugged temporarily into the binocular barrel.

After the camera is attached to the top eyepiece, the surgeon himself may focus and compose, still remaining sterile, simply by looking through the viewer of the self-supported camera while focusing the image by turning the usual microscope focusing gear. On the other hand, the assistant or circulating nurse who has slipped the camera onto

*The Trans-switch (Richards Manufacturing Company) of Dr. Shea provides 6.4 amperes to the 30-watt lamp when the pedal on the unit is depressed. If the unit is already on hand, it can be quite useful, even though there is no provision for adjustment of the surgical and photographic intensities.

†The $\times 10$ eyepiece is used only as a mate to the one equipped with the Zeiss side tube. It does not have a removable plastic collar. The House and the Shea observer tubes employ standard $\times 12.5$ eyepieces at the top, and the photo-collar will fit both their top and their side eyepieces.

the stand can also focus simply by rotating the focusing rim (and thus the eyepiece) until the wanted level of the field is sharply in focus. Often one must choose between a focus level on the incus or on the footplate area (fig. 7), and with this degree of limitation of depth of field, precise focus control for each picture is essential. The range of focus (16 diopters) provided by the eyepiece itself allows complete freedom of focus without readjusting the microscope gear. Reference to the focus setting of the eyepiece prior to camera attachment enables the assistant to reset the eyepiece to that mark when the camera is removed. Transocular photography at the top of the binocular head utilizes the available light to its maximum and makes possible photographs through the ear speculum at ×16 settings with the ×12.5 top ocular and the 200 mm. microscope objective lens, at a speed of one-fifteenth second. Occasionally the ×25 setting can be employed (fig. 7).

On the other hand, when the focusing observation side tube is used for photography (fig. 3) a certain amount of light is lost because the image has been divided partially between it and the eyepiece on top. In order to preserve the maximum exposure time of one-fifteenth second with this less bright image,* lower magnification settings must be used. When the subject matter is included in a larger field and no speculum is used for surgery, side-tube photography is especially useful (fig. 9). This approach will probably be quite adequate also for photography during ophthalmologic microsurgery, since the subject matter is larger and not contained within a deep cavity. Camera attachment and focusing are accomplished in the same way by the side tube as described above for the top ocular eyepiece, except that the camera is not self-supporting and must be hand held.

The microscope can also be used primarily as a close-up camera attachment in situations where it is not routinely used for surgery. It has been useful for the photography of specimens (fig. 6), and the author has used this setup to photograph tympanic membranes as well as oral lesions in ambulatory outpatients.

COLOR PLATES

The accompanying color photographs are included in order to illustrate the versatility and effectiveness of the transocular technique. The plates were made from positive 35 mm. transparencies of *Kodak High Speed Ektachrome Film, Type B*, normally processed. The magnification settings refer to the microscope settings at the time the picture was made; the 200 mm. microscope objective was used for all photographs. Illumination was provided by the standard 30-watt lamp burning at the currents specified.

Figure 5 illustrates the value of the transocular technique in the laboratory. Since time exposure is possible here, the normal lamp with the normal microscope transformer was used. This picture was made with the self-supporting camera at the top ×12.5 eyepiece. The lamp was burning at a current of 4.8 amperes ("high" setting on the standard microscope transformer) and the exposure of one-half second was made with the camera self-timer to avoid motion.

Macrophotography of small objects, made between cases in the operating

*The exposure data refer specifically to the Zeiss observation tube; exposures with the other side tubes may vary somewhat.

room, is illustrated in figure 6. The method of camera attachment and illumination intensity were the same as in figure 5. However, a setting of only ×16 magnification was used. This smaller image, plus the additional advantage of a subject completely out in the open and exposed to additional room illumination, permitted an exposure of one-eighth second. This setup can be used to photograph numerous small objects.

Figure 7 is an example of photography through the ear speculum during surgery. The camera was attached at the top ×12.5 eyepiece and the composition and focusing were adjusted by the sterile surgeon as described above. The lamp intensity of 6.4 amperes permitted an exposure of one-fifteenth second. This photograph was made at magnification setting ×25, although usually it is wiser to make pictures under these conditions at ×16 (fig. 8). Note the accurate color rendition of the blue, normal stapes footplate, which contrasts with the red mucosal capillaries. Because depth of field is limited, focus must be accomplished with care. Use of higher magnification setting limits depth of field, as is evidenced by a comparison of this photograph with figure 9, made at ×10.

The most frequently used arrangement for speculum photography was the one used to make figure 8. The setup and illumination were the same as in figure 7, but in this case a magnification of ×16, the usual surgical setting, was employed. Notice again the importance of color for distinguishing the thinnest area of the otosclerotic footplate.

The last figure is an example of the usefulness of the observation side-tube technique. The camera was held by hand at the Zeiss observer side tube. At 6.4 amperes, and with a magnification setting of ×10, an exposure of one-fifteenth second was possible. This would not have been possible had a speculum been used, but was quite applicable to the surgical situation illustrated here.

SUMMARY

The foregoing discussion is devoted to a description of two new devices and the basic approach to photography during microsurgery for which they are intended. The technique has enjoyed successful application in the hands of a number of interested otolaryngologists and is offered here in order to encourage wider use of photography during microsurgery. Its main features are its simplicity, availability, and economy. A recognized limitation of the technique is lack of complete automation; the surgeon must be willing to pause briefly while several photographs are taken. It is, in the opinion of the author, quite unlikely that a completely automatic and reliable device, simple and inexpensive enough to appeal to the practicing microsurgeon, will soon appear. If a useful system is ignored while awaiting the ideal one, permanent records of many important cases will be lacking.

REFERENCES

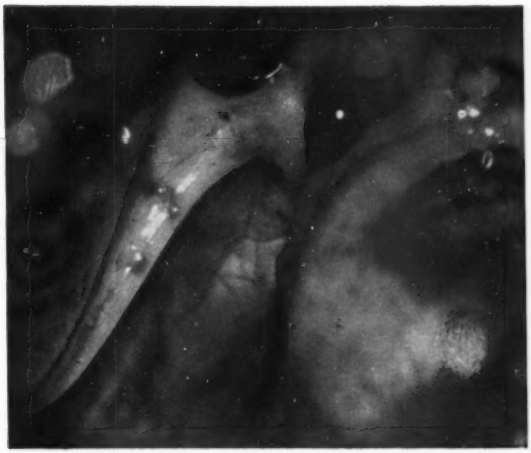
1. Brubaker, Joseph D.: Personal communication.

2. Erulkar, Solomon D., et al.: Experimental studies on the fenestra ovalis technique of Shea. In Press.

3. Myers, David; Brenman, Arnold King; and Schlosser, Woodrow D.: Photography during otologic microsurgery, Medical Radiography and Photography, 36 (no. 2): 45-62, 1960.

ACKNOWLEDGMENTS

The author wishes to express his gratitude to Dr. David Myers, Professor and Chairman of the Department of Otorhinology, Temple University of Medical Center, not only for his encouragement and support in this work, but also for his patience in permitting the numerous interruptions during his surgery which were necessary during its development. He and Dr. Woodrow Schlosser are thanked also for permitting the author to make and reproduce here photographs of their cases. All color plates are reproduced with the permission and cooperation of the Eastman Kodak Company, publishers of the journal *Medical Radiography and Photography*[3] in which they appeared originally. Figure 10 is printed with the additional permission of Dr. S. D. Erulkar, senior author of the paper[2] in which it was reproduced. Figures 1 through 4 were made from photographs prepared by Messrs. Taylor of the Temple University Medical Center Department of Photography.



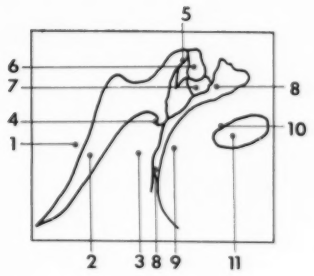
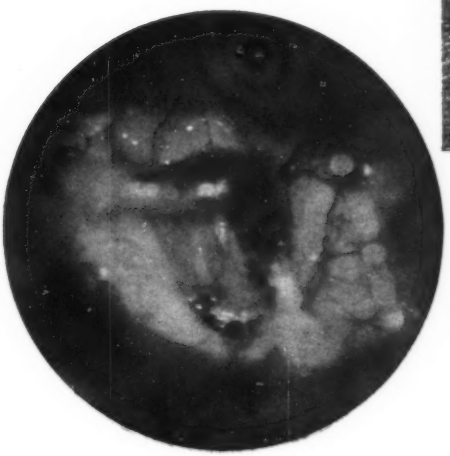


FIG. 5—Laboratory use of transocular photography; vein graft procedure in middle ear of anesthetized cat (×25). The tympanic bulla of right side has been opened from below. (1) Tympanic membrane; (2) malleus handle; (3) tensor tympani muscle; (4) muscular process of malleus; (5) incudomalleolar articulation; (6) incus; (7) plastic prosthesis; (8) vein graft; (9) promontory; (10) round window; (11) round-window membrane.

FIG. 6—Macrophotography specimen (×16). The human stapes and a 3.5 mm. plastic prosthesis.



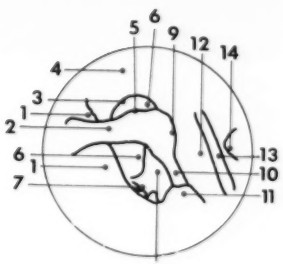


FIG. 7—Surgical photography (×25) through ear speculum; normal middle ear. (1) Facial canal; (2) incus; (3) anterior edge of oval window; (4) skin flap; (5) anterior crus; (6) stapes footplate; (7) mucosal web; (8) posterior crus; (9) stapes neck; (10) stapedius tendon; (11) pyramid; (12) promontory; (13) chorda tympani; (14) round window.

FIG. 8—Surgical photography (×16) through ear speculum showing a stage in preparation of new oval window in an area completely obliterated by otosclerosis. The stapes superstructure has been removed and the oval window area has been partially thinned. (1) Facial canal; (2) dissected mucosal edge; (3) incus; (4) thinned otosclerotic bone overlying oval window area; (5) denuded and saucerized promontory; (6) intact promontory.

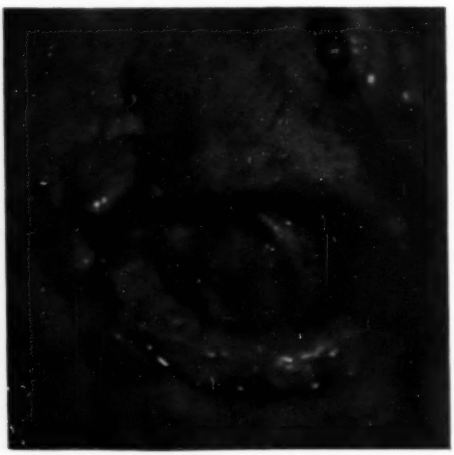


FIG. 9—Surgical photography (×10) through Zeiss observation side tube showing early stage of postauricular tympanoplasty. The auricle has been reflected forward. (1) Skin of superior external canal; (2) skin freed from bony canal; (3) sclerotic plaque in remaining eardrum; (4) eustachian tube; (5) mastoid cortex; (6) fibrous mucosa; (7) tragus; (8) margin of perforation; (9) remnant of eardrum; (10) skin of posterior external canal.

THE USE OF COMPUTERS IN STUDIES OF AUDITORY NEUROPHYSIOLOGY

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BY INVITATION

IT is the purpose of this paper to describe several ways in which electronic computers have been used by members of the Communications Biophysics Laboratory, at the Massachusetts Institute of Technology, in the study of the electrical activity of the auditory system, and to suggest certain possible applications of these techniques for research and clinical use in otology.

Let me, at the outset, prescribe some bounds for this discussion. I shall make no attempt to describe the computers themselves, because they have already been described elsewhere.[1,2,8a] Rather, I shall treat them as functional units and concentrate on the rationale behind their use. I shall emphasize those usages that seem to be particularly relevant to the study of auditory phenomena.

First, I shall make a few general remarks about computers as research tools. Although so-called general-purpose computers have great flexibility with respect to the kinds of computation possible, their usually large size prevents them from becoming routine laboratory devices. They are most useful as instruments for performing experimental computations, which can then be evaluated. Once a particular computation has been shown to be useful, special-purpose computers can be built and used routinely, just as we use an oscilloscope or a microscope. In our case, such computers are designed specifically for physiological work and bear little resemblance to business machines. Our own work is primarily concerned with the electrical activity of the nervous system, so the computers that we use are designed to accept such data taken either from the subject directly or from recordings on magnetic tape.

COMPUTERS AS AIDS IN RESPONSE DETECTION

The principal electrophysiological method for studying any sensory system consists in recording electrical changes in the subject while the system is stimulated in a controlled manner. If an acoustic stimulus is delivered to the ear, a chain of activity that has electrical correlates in many parts of the nervous system is initiated. These electrical correlates can be recorded by electrodes that are small enough to record single-cell activity or large enough to record the summed activity of populations of cells. I shall now describe some computations that are useful in the study of population responses.

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Presented at the Sixty-Fifth Annual Session of the American Academy of Ophthalmology and Otolaryngology, Oct. 9-14, 1960, Chicago.

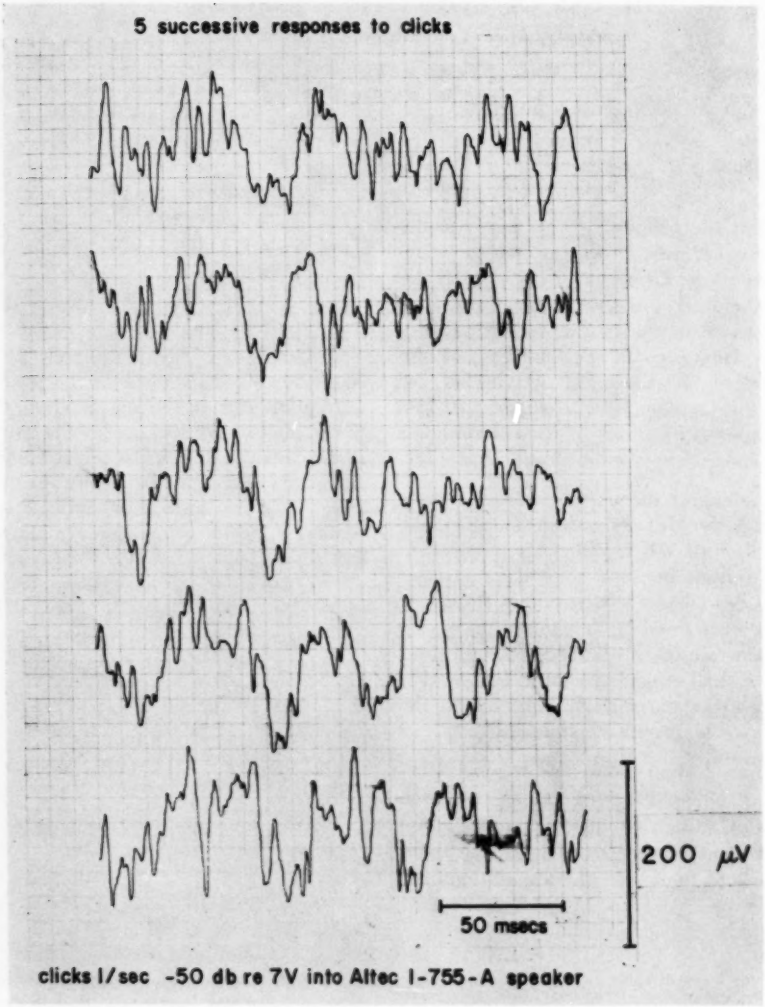

FIG. 1—Individual responses to clicks recorded from the auditory cortex (AI) of an unanesthetized cat. Clicks of moderate intensities were delivered by a speaker. Reference electrode, on the frontal bone. Upward deflection indicates negativity of the auditory cortex. There appears to be a positive response which peaks at a latency of 70-80 msec, but the background activity is obviously troublesome.

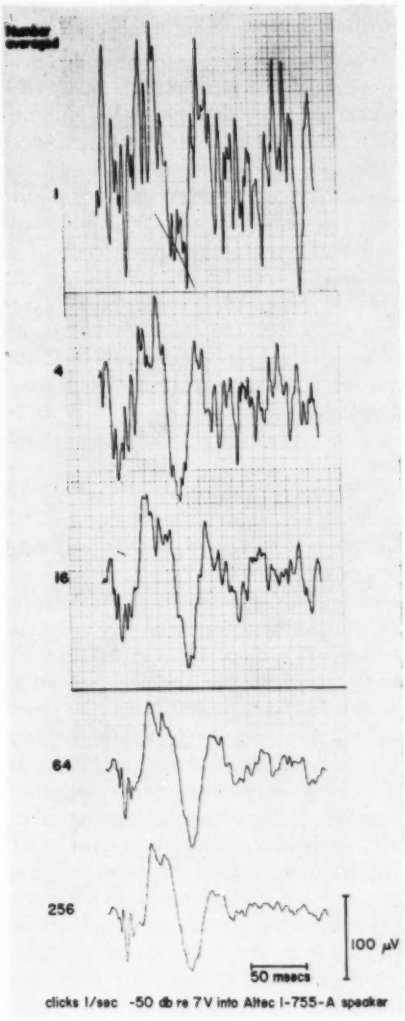

FIG. 2—Effect of averaging on evoked auditory responses from the cortex (AI) of an unanesthetized cat. The data are from the same sample of responses as those shown in figure 1. The top trace shows one individual response, the next trace below it shows the average of the response shown in the top trace and the responses to the three succeeding clicks. The average shown in each lower trace includes the responses averaged in the trace above it. The background noise level may be judged from the top trace.

Neurophysiologists, since they are human, usually prefer to study responses that are easily recorded and manipulated. Population responses are large only when a great number of units responds in synchronous fashion and the geometric arrangement of the units is favorable. In some instances, the responses cannot be conveniently recorded from favorable sites and responses will be apparently small. Also, it is well known that the nervous system is not quiescent in the absence of controlled external stimulation, but has "spontaneous" activity. Any response or signal must then be detected against this background activity. If the signal is small relative to background activity, then a response may be difficult to study or even detect. If one may assume that the response has very nearly the same waveform and latency for each stimulation, one may repeat the stimulus many times and by computation obtain an average response.

In general, the procedure may be described as follows: The electrical activity of the subject (human or animal) is recorded on one channel of the tape recorder. The times at which stimuli are delivered are marked by recording a time marker on a parallel channel. The computer, essentially, divides the recorded electrical activity into sections of time; each section begins with the presentation of one stimulus and ends with the presentation of the next. Averaging consists simply of adding the various sections together. Since the background activity is independent of the stimulus time, its average will tend toward zero. The responses, however, are related in time to the stimuli, and thus have a nonzero average.

We have applied this technique of averaging in circumstances in which responses are small, or background activity is high. A few examples will suffice.

The electrical activity was recorded from the auditory cortex of a cat in which an electrode had been implanted six months previously. The animal was awake and sitting quietly in a soundproof room, on the lap of a girl. Clicks were delivered from a speaker at a slow, regular rate. Inspection of the five successive samples of activity (fig. 1) reveals that although a response is detectable, the presence of the high background activity makes systematic study difficult.

Figure 2 shows the effectiveness of averaging in extracting responses from the background activity. (For a constant response, the signal-to-noise ratio is increased by a factor that is the square root of the number averaged.[2] We have thus been able to study these evoked cortical responses in unanesthetized animals and relate them to the classical evoked responses so easily obtained from anesthetized preparations.[5a]

In another series of experiments, it became important to study cochlear responses at very low stimulus intensities. The waveform of responses to clicks that were 5 decibels above the Visual Detection Level (VDL) was recorded from a location near the round window (fig. 3). The background activity level is very low compared with that of the cortex, but the responses in this case are very small. The average response clearly displays the waveform that was not easily discernible in the individual responses.

Other circumstances in which we have found averaging useful are in the detection of responses when stimuli are presented at high rates,[5,9,10] in the systematic study of cortical off-responses in unanesthetized animals,[7] and in the study of responses obtained from denervated cochleas.[6] In some of these studies, responses that were only a fraction of a microvolt in amplitude could be studied easily.

Possibly the most intriguing practical application of averaging lies in the detection of evoked responses from humans when only externally placed electrodes are used.[3] Such responses are usually difficult to detect because of the very low amplitudes of the signal and high background activity. Recently, C. D. Geisler and I were curious to see whether peripheral responses were recordable from humans. We placed an EEG electrode on the scalp behind the ear of a human subject. Recordings were taken from this location as clicks were delivered to the subject through earphones. After averaging, a very complex response was obtained (fig. 4); it is, however, certainly amenable to further study. I believe that such recording and processing techniques can be made so simple and convenient that validation for diagnostic purposes may well be within our grasp. One group has already attacked the problem of audiometric studies in children by such means.[8] It would also be useful in cases that are now classified as nerve-deafness to study directly the electrical responses from the cochlea, the auditory nerve itself, or higher locations in the brain. The computers used in averaging are now capable of "on line" performance and are no larger or more difficult to operate than are EEG machines. This feature makes the computed responses available as the recording of responses is conducted, without the necessity of recording onto magnetic tape. With these features the computers may well find good use in monitoring the effects of operative procedures on auditory responses directly. The promise of these methods is such that otolaryngologists should seriously examine the clinical possibilities.

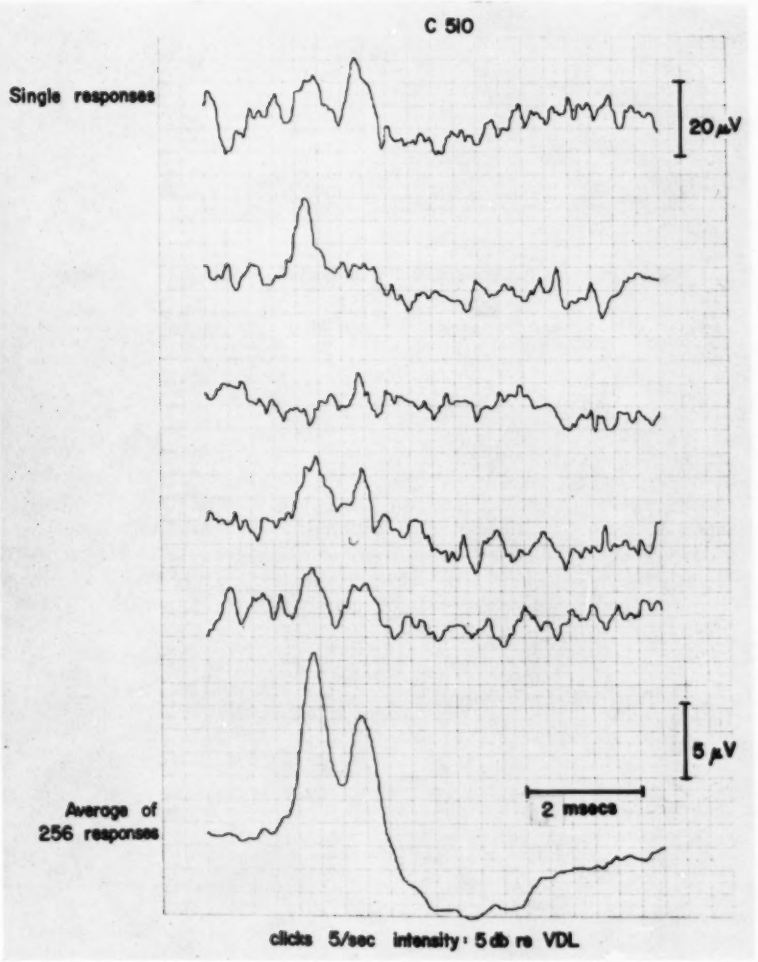

FIG. 3—Cochlear responses to clicks presented at an intensity near Visual Detection Level (VDL). VDL, in this cat, was approximately —105 db re 4 V across a PDR-10 earphone. The cat was under Dial anesthesia with a plastic tube connecting the earphone with the external auditory meatus. The recording electrode was placed on the bone of the cochlea near the round window and referred to the headholder. Although it is difficult to discern the waveform of the response in individual traces, that of the average of 256 responses is easily studied.

QUANTITATIVE STUDIES OF ELECTRICAL ACTIVITY

Not as immediately striking, but perhaps more important in the long run, are the opportunities that such computations (in particular, "on line" computations) give us for studying the basic physiology of the auditory system in a quantitative manner. One of the very great difficulties in the study of physiology is the inherent variability of responses

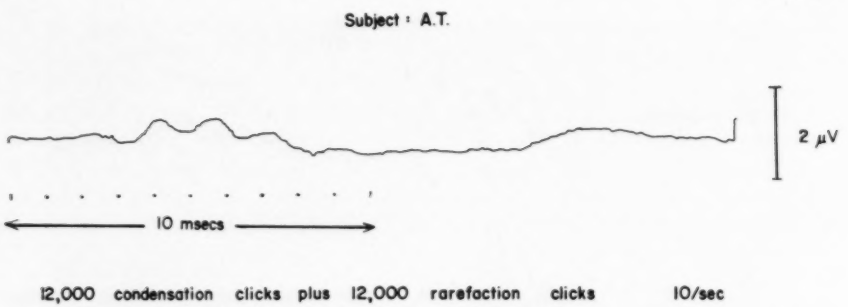

FIG. 4—Average of click responses recorded from a scalp electrode placed behind the pinna of a human subject just short of the hairline. In this case, the responses to 12,000 condensation clicks were added to the responses to 12,000 rarefaction clicks. Intensity of clicks: —40 db re 4.4 V across a PDR-10 earphone. The significance of these potentials is unknown; however, they are unlikely to be microphonic potentials and the latencies are too long for auditory nerve potentials. Reference electrode on nose.

from the living organism. Physiological laws, as indeed all laws, must be quantitative to be truly meaningful, and so must deal with variability as a property of the system. Figure 5 shows several curves from a study made before the advent of the computer in our laboratory.[11] In order to obtain these curves that show the amplitude of evoked cortical responses as functions of both stimulus intensity and anesthesia level, we had first to read the film on a microfilm reader, measure each response, and then add fifty successive responses to obtain just

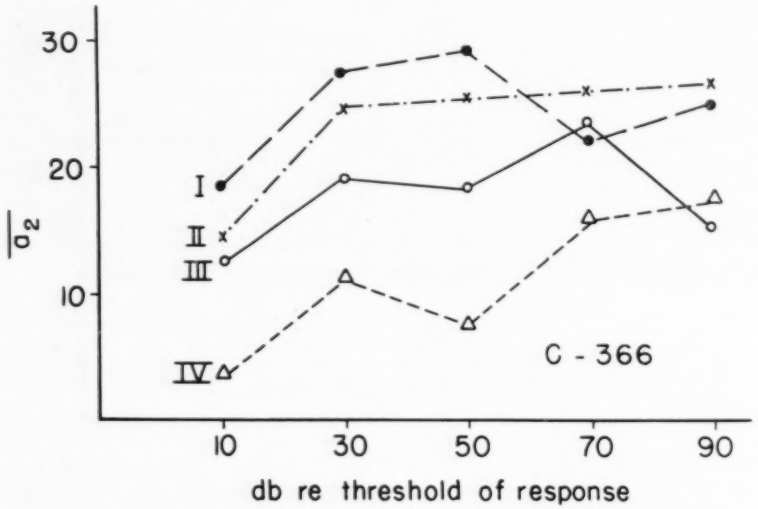

FIG. 5—Intensity functions of click-evoked cortical responses from AI of a cat under Dial anesthesia. The average amplitudes of groups of 50 consecutive responses are plotted against click intensity for each of four levels of anesthesia: I, II, III, IV in order of increasing depth of anesthesia: The average amplitudes ($\bar{a}_2$) are expressed in arbitrary units. Threshold of response is VDL.

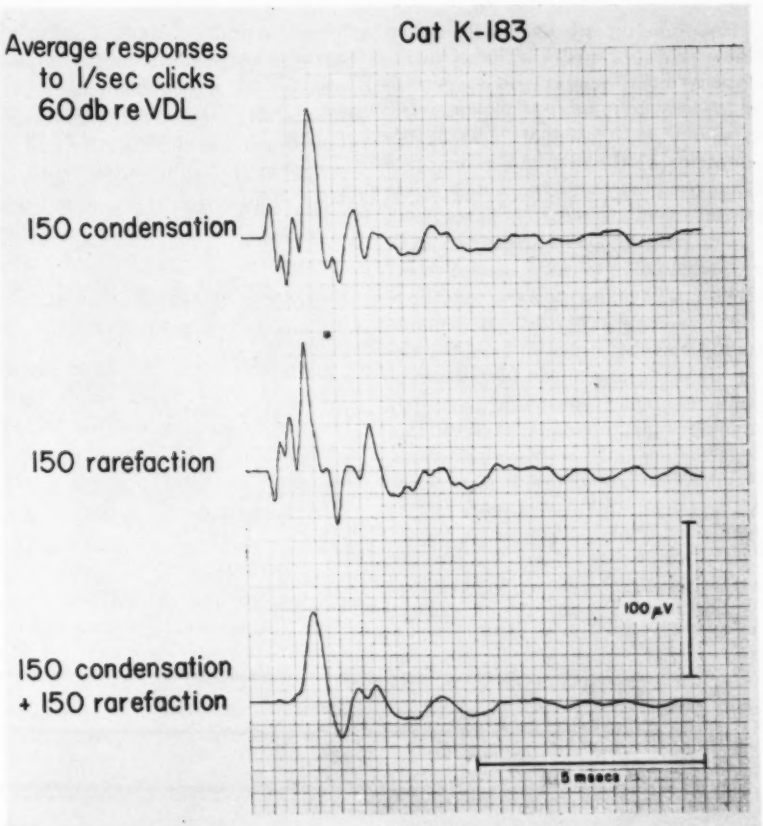

FIG. 6—Cancellation of microphonic potentials in recordings from the cochlea of a cat under Dial anesthesia. The recording electrode was placed on the bone near the round window and referred to the headholder. Top trace shows the average of 150 responses to condensation clicks; middle trace, the average of 150 responses to rarefaction clicks; and bottom trace, the average of the two upper traces. Note that the microphonic potential is almost completely cancelled in the bottom trace and a "pure" neural potential is left. At higher click intensities the microphonic potentials almost obscure the neural potentials and cancellation is even more necessary for studying neural potentials. Upward deflection indicates negativity at the round window.

one point on a curve. Today, we can plot such a series of curves during the course of the actual experiment.[10] No longer is it necessary to run an experiment almost blindly, and wait weeks or months to obtain the final processed results—only to find that the most interesting experiments had not been tried. It is now possible to let the results dictate the further course of the experiment. The relative ease with which such quantitative results can be obtained makes multiparametric studies much more convenient.

In certain special circumstances, averaging enables the separation of components of a complex response.[6] The coch-

lear responses recorded from the round window are mixtures of components that behave differently with respect to changes in stimulus parameters. The microphonic potentials are linear representations of the stimulus waveforms for all except very high intensities. Thus when the stimulus polarity is reversed, the microphonic polarity reverses. The neural potentials from the cochlea, however, do not have this property and have the same polarity, regardless of stimulus polarity. This difference in behavior enables us to separate cochlear microphonic potentials from neural potentials by adding equal numbers of responses to rarefaction and condensation clicks. The microphonic potentials cancel almost completely and leave a more or less "pure" neural potential. This technique has been of great value in studying the behavior of these potentials separately for a wide range of stimulus conditions. Figure 6 shows the effectiveness of the method as applied to recordings from an electrode placed near the round window of a cat.

ANALYSIS OF PATTERNS OF ACTIVITY IN SINGLE UNITS

So much for the studies of population responses. Data from single units as recorded by a microelectrode leads us to different kinds of computation.[4] To a first approximation, a single nerve cell either fires or does not fire, so that the

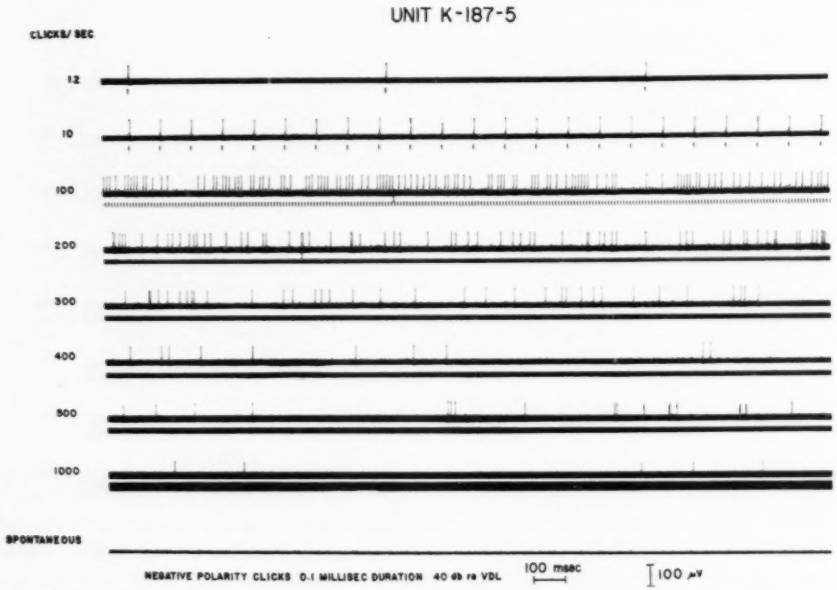

FIG. 7—Photographic displays of the activity of a single unit in the dorsal cochlear nucleus as a function of click rate. The top trace for each click rate shows the electrical activity recorded by a metal microelectrode (time markers below each such trace indicate the times of click presentation). Each spike is a single discharge from the unit and rides on a slower wave that is the population response at this location. The population responses are especially noticeable at 100 clicks per second, since they appear for each click presentation, although the unitary responses frequently drop out. This particular unit shows no significant spontaneous activity. (Dial anesthesia.)

important concept is that of a spikelike event, the amplitude of that event being relatively constant. Thus the study of single-unit activity depends heavily on analysis of time patterns of an event. Figure 7 shows a representative sample of such data. The activity of a cell in the cochlear nucleus is shown as a function of click repetition rate. Clearly, the response pattern changes, but how can the changes be described quantitatively?

One possible display is to show the spikes as a function of time after each stimulus presentation. Since the pattern of spikes varies from stimulus to stimulus, it is necessary to use some statistical description of the time pattern of spikes. By adding many such displays for repeated stimulus presentations, we obtain a post-stimulus time histogram (PST histogram). Such a histogram displays the time pattern of the spikes averaged over many stimuli. One observes that the area under the distribution decreases as the click rate increases although the general shape of the distribution appears not to change. There is also a slight shift in the latency of the peak of the distribution (fig. 8).

The response pattern may also be examined by measuring the times between successive spikes (the interspike intervals) and plotting the number of occurrences of particular intervals as a function of the interspike time interval (interval histogram). This display turns out to be very interesting (fig. 9). The most heavily populated intervals are those that correspond to the interval between successive stimuli and higher harmonics of that interval. Thus there is a great tendency for the unit to fire with the clicks even if it misses or skips. This coercion of responses by the clicks demonstrates the ability of the auditory system to preserve time pattern information.

The PST histogram becomes especially interesting in cases in which a response is poorly defined because of spontaneous activity. Figure 10 shows the PST histograms of responses from a single unit in the cortex of an unanesthetized, unrestrained cat in which a chamber for microelectrode recording had been previously implanted. Visual examination was not satisfactory for indicating the nature of the response. The PST histogram, however, shows that there is a decrease of activity after the click.

There is no question that such computations, as well as more sophisticated ones, are essential if we are to make quantitative statements about time patterns. It is only through such quantitative statements that the functional laws of the auditory system will be formulated.

SOME CAVEATS

Perhaps, a few words of caution are appropriate. In using computers one must always be on the lookout for the unexpected. One illustration is supplied by the following case history: M. H. Goldstein, Jr., R. M. Brown and I were once faced with the problem of recording cortical responses at high rates of stimulation.[5] Since these responses were small and the background activity large, we decided to use averaging. We were somewhat dismayed to find that while the recording electrode was indeed placed on the cortex, the records contained much activity that subsequently proved not to be cortical in origin. In fact, one can even detect cochlear microphonics from cortical electrodes if sufficient numbers of responses are averaged. This question of localizing responses occurs over and over again; it can only be solved by a long series of control experiments. The experimeter is in

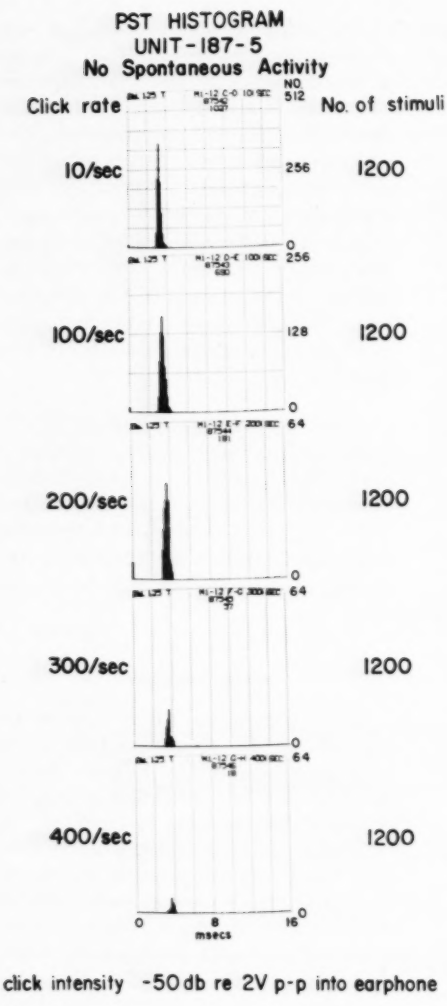

FIG. 8—PST histograms of the same sample of data from which figure 7 was taken. Abscissae show the time after click presentation; ordinates, the number of spikes having a particular time relation to the click summed over all 1200 of the click presentations. (Only one cycle is shown in each histogram.) As expected, from examination of figure 7, the spike responses occur less frequently as rate is increased, but the histograms also show a latency shift in the peak of the distribution.

somewhat the same position as the sorcerer's apprentice in that, having instructed the computer to detect responses, he discovers that he really wants only *certain* responses. Computers, like children, are extremely literal, but, unlike children, will do exactly as instructed, no more, no less. It is important to instruct the computer with explicit precision.

Another difficulty is psychological. The computers display their results so beautifully that the responses from even the most moribund preparations emerge pristine. While the responses may look

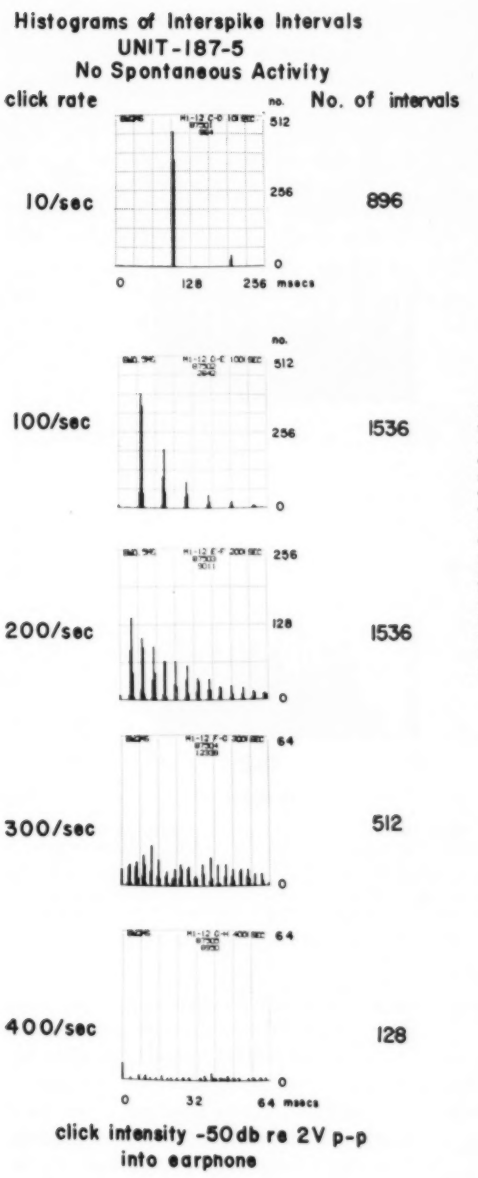

FIG. 9—Histograms of interspike intervals of the same sample of data from which figure 7 was taken. The first peak in each histogram occurs at the period (time separation) of successive clicks; the second peak shows the number of intervals that are twice as long as the period of the stimulus (that is, the spike responses fail for one click); the next peak shows the number of intervals that are three times as long as the period of the stimulus (that is, the spike responses fail for two successive clicks). As the rate becomes very high the responses decrease in number. Note that the time scale for the top histogram is four times that of the others. (Figures 8 and 9 both give quantitative representations of certain features of the time pattern of activity displayed in figure 7.)

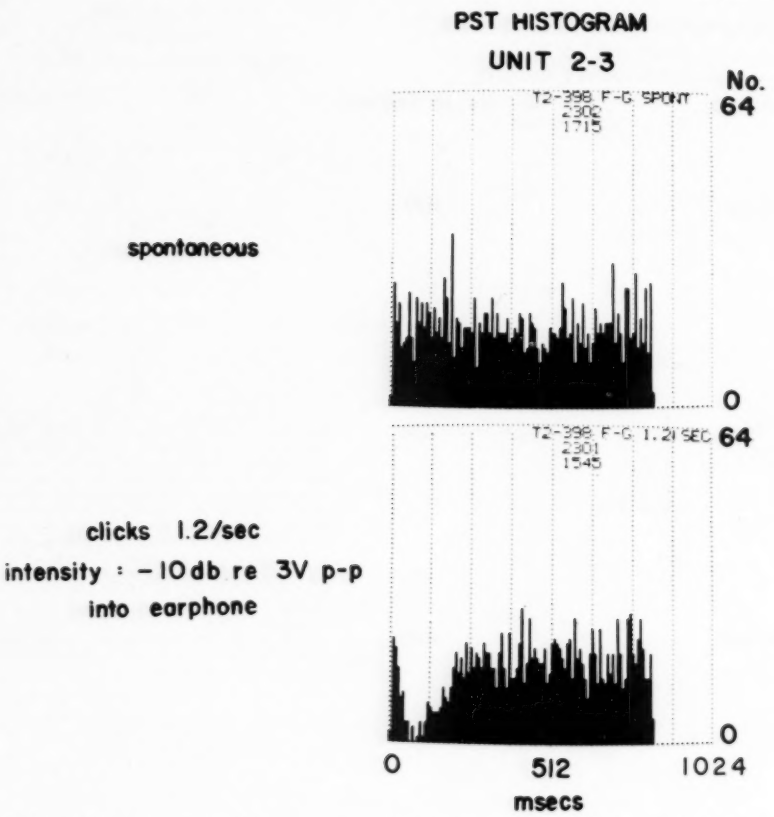

FIG. 10—PST histograms of the activity of a single unit in the auditory cortex (AI) of an unanesthetized cat with an implanted chamber. Recording was from a tungsten microelectrode inserted through the dura and into the cortex by a remote-controlled hydraulic micromanipulator. Top histogram shows that when no clicks were delivered to the animal, there was considerable spontaneous activity; the bottom histogram shows that, on the average, the spontaneous activity is suppressed for a time after the click is presented. The "response" in this case consists in a decrease —not an increase—of activity.

"clean," they are still only representative of a "bad"' preparation. There is a distinct tendency to forget that the results are still only as good as the data from which the computations are made.

Finally, and perhaps most important, although the computer processes data, it does not interpret them, and the physiological implications of some of the more subtle computations are tricky indeed. The computer enables us to perform experiments that would not have been atempted many years ago, but, in the end, the experimenter must give the results meaning. Since the computers are so literal, they emphasize the need for a well-formulated problem, a problem that can be explicitly stated. To be able to make specific propositions that have physiological significance is a real commentary on the scientific status of the field.

In conclusion, I would like to point out one factor of immense practical importance—the factor of cooperation between physiologists, physicists, mathematicians, and engineers. We have been especially fortunate in our laboratories to have individuals in the several fields who have learned enough about the correlative fields so that very real cooperation and collaboration are commonplace.

Perhaps in the near future otologists will make their own special contributions in applying these techniques to the study of disease processes.

ACKNOWLEDGMENTS

I would like to thank the colleagues who have collaborated with me in the studies from which many of the examples have been taken, principally, R. M. Brown, C. D. Geisler, G. L. Gerstein, M. H. Goldstein, Jr., W. T. Peake, D. H. Raab, and T. T. Sandel. I was also fortunate in having the technical assistance of Louise F. Clark, Eleanor C. Thomas, and Alan H. Crist of the Eaton-Peabody Laboratory, Boston, Massachusetts, and Phokion Karas of the Research Laboratory of Electronics, Massachusetts Institute of Technology. Special thanks are due Professor W. A. Rosenblith, who has kindly given his guidance and counsel throughout these studies.

REFERENCES

1. Clark, W. A., et al.: The average response computer (ARC): a digital device for computing averages and amplitude and time histograms of electrophysiological response, IRE Trans Med Electronics, 8:46-51, 1961.
2. Communications Biophysics Group of Research Laboratory of Electronics and W. M. Siebert. Processing Neuroelectric data (The Technology Press of the Massachusetts Institute of Technology, Cambridge, Mass., 1959); Technical Report 351, Research Laboratory of Electronics, M.I.T., July 7, 1959.
3. Geisler, C. D.; Frishkopf, L. S., and Rosenblith, W. A.: Extracranial responses to acoustic clicks in man, Science, 128:1210-1211 (Nov.) 1958.
4. Gerstein, George L., and Kiang, Nelson Yuan-sheng: An approach to the quantitative analysis of electrophysiological data from single neurons, Biophys J 1:15-28 (Sept.) 1960.
5. Goldstein, M. H., Jr.; Kiang, Nelson Yuan-sheng, and Brown, R. M.: Responses of the auditory cortex to repetitive acoustic stimuli, J Acoust Soc Am, 31: 356-364, 1959.

5a. Kiang, Nelson Yuan-sheng; Neame, J. H., and Clark, L. F.: Evoked cortical activity from auditory cortex in anesthetized and unanesthetized cats, Science, 133:1927-1928 (June 16) 1961.

6. Kiang, Nelson Yuan-sheng, and Peake, William T.: Components of electrical responses recorded from the cochlea, Ann Otol, 69:448-458, 1960.
7. Kiang, Nelson Yuan-sheng and Sandel, T. T.: "Off" responses from the auditory cortex of unanesthetized cats, Arch Ital Biol (Pisa), 99:121-134, 1961.
8. Lowell, E. L., John Tracy Clinic, Los Angeles, California: Personal communication, 1960.

8a. Mitchell, J. L., and Olsen, K. H.: TX-O, a transistor computer with a 256 by 256 memory, Eastern Joint Computer Conference, 1956, pp. 93-101 (Published by AIEE).

9. Peake, W. T.; Goldstein, M. H., Jr., and Kiang, Nelson Yuan-sheng: Responses of the auditory nerve to repetitive acoustic stimuli, J Acoust Soc Amer (in press).
10. ———: Rate functions of auditory nerve responses to bursts of noise: Effects of changes in stimulus parameters, J Acoust Soc Amer (in press).
11. Raab, D. H., and Kiang, Nelson Yuan-sheng: Changes in cortical click responses as a function of click rate intensity and depth of anesthesia, Quarterly Progress Report, Research Laboratory of Electronics, M.I.T., Cambridge, Mass., Oct. 15, 1955, pp. 76-79.

A CLOSED METHOD OF SEMICIRCULAR CANAL FENESTRATION

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NEW YORK, NEW YORK

In 1948, while still in training as a resident in Boston, I had the opportunity of meeting Dr. Frederick L. Jack, who was then well into his eighties. I knew that Dr. Jack was a representative of that group of otologists who worked in the field of functional ear surgery in the 1890's, and I was told that he had performed 60 stapedectomies in the early years of his career. What I did not know, and could not foresee, was that in a few years stapedectomy would again be revived. I have since realized that I missed a great opportunity to ask many questions, because then my curiosity about the early years of functional surgery was not what it is today. I have often wondered what Dr. Jack, or any of the great otologists of his period, might think of our present efforts, for, in a sense, we are traveling the same road that, for them, ended in complete repudiation of oval window surgery.

As T. G. Wilson[12] has pointed out, we have speculated much, and with wonder, that these men could have so abruptly discarded these "interesting and promising operations" of stapes mobilization and stapedectomy. They had the knowledge of Toynbee's pathological findings and a deep understanding of the physiology of the sound conducting mechanism. Kessel had led the way. Miot had published an impressive series of 200 cases of stapes mobilization. Boucheron, Moure, Pottier, and others on the continent, and Blake and Dench in this country, had taken up the operation. The results reported were very promising. Faraci had gone further and had attacked the footplate directly when mobilization failed. He also removed bone from the posterosuperior meatal wall to expose the stapes better, and he tested the hearing at intervals while the operation was being performed.

Why, then, as Wilson asks, were all the great otologists of the period—Politzer, Siebenmann, and Denker — so completely opposed to these procedures when they had no other recourse for the restoration of hearing? We have become fond of pointing to our technological skills, our exceptional instruments, our antibiotics, and our magnification and lighting. We have shown that continuity of sound transmission across the middle ear can be accomplished with plastics, metal inserts, and other mechanical means. Our authors have insisted that with these instruments and materials we have made real advances in the treatment of deafness. Now that we, too, have come to stapedectomy, which Kos[7] has called "the final step in this historical replay of events," it would be interesting to know how impressed the old generation would be with the procedures we are using today.

It might help to assess our progress if a discussion between a modern otologist and one of sixty years ago were set forth, in the manner of Galileo's "Dialogues About Two Sciences." The otol-

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ogist of sixty years ago, having seen our procedures, might say:

Well, this is fine: Many of the surgical instruments look very familiar, but I am sure that with the microscope you can see the stapes better than we could. We also like your method of making the incision in the posterior wall of the canal and folding the drum forward. And certainly you have new instruments for diagnosing deafness. But what else have you added? Surely you know our problem was a matter neither of technique nor of infection. We were able to mobilize the footplate in a gratifying number of cases. You must be familiar with Miot's series of 200 cases in which he had no labyrinthine or any other complications.

Modern Otologist:

What then was your problem? We have thought that we could improve on your technique and accomplish what you gave up.

Elder:

Our difficulty was the pathological nature of otosclerosis itself. When we encountered extensive otosclerosis consisting of bone that was mature and calcareous, we were not able to mobilize or extract the stapes. We recognized this limitation. The cases in which we were able to mobilize, with initial improvement in hearing, were those of ankylosis in the beginning stage, where the bone was spongy and vascular. Unfortunately, the vascularity of this actively growing bone made refixation almost inevitable, and the restoration of hearing was only temporary. There were some cases in which the bone growth was mature and the fixation of the stapes limited. Under these circumstances we were able to make a fracture that might not heal. We found, however, that these cases were simply too few to show enough permanent results in the record. We think that the pathologic changes in your modern times as described by Ruedi and Simpson Hall, cannot be different. What have you done to overcome them?

Modern:

We have developed twenty-three different techniques for restoring hearing through the oval window.

Elder:

But have you solved the problem of refixation and continued bony growth?

Modern:

There is ample evidence that we are getting plenty of refixations, but we have gone on to stapedectomies to get around this problem.

Elder:

That has a familiar ring. We tried that, too. Perhaps you have seen Politzer's statement about stapedectomies. He said, "The great expectations that were attached to these operations, due to the good results reported, have not been fulfilled, as continued observations, for the most part, showed unfavorable late results." But tell me, there were many stapes that were so firmly ankylosed that we were not able to remove them. How have you gotten around this?

Modern:

We have developed some ingenious techniques for drilling, chiseling, fracturing, and prying away the footplate.

Elder:

Does this stop the progress of the disease?

Modern:

That has not been determined yet.

Elder:

Well, I'm sure Faraci would approve. But where the ear is concerned, we often found that the solution to one problem sometimes created two new ones. Can you remove these fixed stapes without injury to the inner ear?

Modern:

We have some dead ears, but the long-term results have not yet been determined. But I must tell you, we do have something new that you never tried. We have plastics and tantalum and steel wire which we use to re-establish continuity of sound transmission across the middle ear, when the crura have been broken and even after stapedectomy.

Elder:

That sounds very promising. But will these materials be permanently tolerated in the middle ear?

Modern:

That has not yet been determined.

Elder:

Well, time will tell. I wonder if you have ever thought about simply leaving the problems caused by the growth of otosclerosis at the oval window, and making an opening in another part of the labyrinthine wall? When we became discouraged by the frustrations we encountered in the pathological area, we finally came to this idea at the end of our time. Did anything ever come of this suggestion made by Passow and Floderus?

Modern:

Yes, we have the fenestration operation.

Elder:

Have you been able to make it work?

Modern:

Yes, but it has not been easy. It has taken almost fifty years to develop an operation that gives predictable hearing.

Elder:

That's a long time. The men who worked on this idea must surely have become discouraged.

Modern:

I think it was evident to all that this approach could give lasting hearing.

Elder:

What are your results?

Modern:

There is no question that hearing can be restored in 80 to 90 per cent, but higher or lower results depend on the motivation for learning to perform the operation skillfully.

Elder:

Do the hearing results last?

Modern:

Yes. There are now at least five reports in the literature on long-term results which confirm the fact that the hearing is lasting.

Elder:

Why, then, are you not satisfied with this surgery?

Modern:

Many of our surgeons, while conceding that the fenestration is a reliable operation, object to the necessity for creating an "open radical cavity" with this procedure. The healing and aftercare of the fenestration cavity have been the main basis for opposition to the operation, by both the patient and the surgeon. The patient has to have some periodic care for the rest of his life, and there is a possibility that he may have a draining ear. This is the reason so many of us have turned back to oval window surgery through the transmeatal route. You must admit that if we can find a way to give permanent results in a high enough percentage of cases, this will be the ideal surgery.

Elder:

I agree. To show permanent results with surgery through the pathological area is the fundamental point. If you are able to do this, you will have succeeded where we failed, and that certainly will be progress. But since you have already solved the basic problem of giving the patient predictable and lasting hearing with the fenestration operation, why do you not try to eliminate the remaining objections to this procedure?

With this final question in our projected conversation, I think we can assess our position today. It can be said, I believe, that further progress can be made only in one of two possible approaches:

A. By discovering some means to cure or neutralize the disease of otosclerosis itself, so that surgical methods can be developed for use through the stapes area, which can eliminate the risks of future complications, or

B. By finding a way to improve the fenestration operation. Of these two, the latter approach seems to be the more practical at the present time.

This is said because I believe that the ideal surgical procedure should be one that gives the patient what *he really wants*, which is the restoration of his hearing in a way which must certainly last, and he wants this without troublesome features if he can get it. In striving toward an ideal operation for otosclerosis, I cannot think it is illogical to hold to the principle that provides for permanent hearing, while still trying to combine this principle with others which eliminate those features that are still objectionable to both the patient and the surgeon.

Following this objective, then, the purpose of this paper is to describe a one-stage, closed method of fenestration which eliminates the postoperative cavity, while retaining the great advantage of bypassing the otosclerotic area with a semicircular canal fenestration. Such an operation, it is hoped, will offer an advance in otosclerotic surgery.

A closed-cavity fenestration operation would have certain obvious advantages to the patient and the surgeon. For the

patient, the following criteria would be paramount:

1. Lasting hearing
2. A postoperative healing period of no more than one or two weeks
3. No need for periodic care of any kind postoperatively
4. No restricted activities; complete freedom to swim and shower
5. A natural ear opening and a natural external auditory canal postoperatively

The advantages for the surgeon would include the following:

1. A more simplified fenestration operation, with no attention needed to provide an endaural opening or a tympanomeatal flap, and less attention and time needed in the exenteration and preparation of a mastoid cavity
2. No need for aftercare
3. The utilization of a standardized operation which can be performed on any temporal bone, regardless of its anatomical conformity

There is nothing new, of course, about attempts to develop a closed-cavity semicircular canal fenestration. This idea goes back to the very earliest endeavors at fenestration of the labyrinth. Bárány,[1] Jenkins,[6] and Holmgren[5] all did closed operations. It was Sourdille[10] who introduced the open cavity method which, with Lempert's modifications,[8] became the classical operation. That the closed operation has not been entirely abandoned is indicated by further attempts in recent years to develop a successful closed procedure. In 1952, Garson[4] described a closed operation, using a postauricular approach, and covering the fenestra with a piece of conjunctiva. The cavity was packed and the wound left open. A week later the packing was removed and the wound closed by secondary suture. Bauer,[2] in 1953, went one step further. After applying the conjunctiva to the fenestra he closed the postauricular wound without packing. Suggit,[11] in 1954, followed Bauer's technique, except that he covered the fenestra with a split-thickness graft taken from the postauricular area. Since nothing more has been heard after a single paper from each of these modern advocates of the closed operation, it is to be assumed that the results obtained initially in some of the cases reported have not been maintained.

OPERATIVE TECHNIQUE

The surgical procedure outlined below is illustrated by figures 1 through 10. Each figure number corresponds to the paragraph number in the outline.

I believe this technique solves the basic difficulties which have been encountered in the past.

1. A single endaural incision is made. In that portion of the procedure prior to obtaining the temporal muscle flap, the upward extension of the incision may be limited, in order to facilitate retention of a self-retaining retractor.

2. An elliptical piece of conchal cartilage, with subconchal soft tissue, is excised, and the auricle is retracted to expose the mastoid cortex.

3. The mastoid is exenterated sufficiently to gain free access to the horizontal semicircular canal. The bony posterior canal wall is taken down with care, to preserve the meatal skin intact. The incus is extracted.

4. The temporal muscle is exposed by extending the endaural incision to the depth of the temporal muscle fascia, where a line of cleavage is obtained between the fascia and the overlying scalp.

The scalp is easily separated from the muscle fascia by blunt dissection and may be tented beyond the limits of the incision for a wide exposure of the muscle.

5. The temporal muscle pedicle flap is cut as indicated, maintaining a self-sufficient blood supply from its pedicle through the posterior deep temporal artery.

6. The temporal muscle pedicle flap is brought down into the mastoid cavity and tailored to cover the head of the malleus and the horizontal semicircular canal. A dehiscence to the middle ear is maintained so that mucosa from the middle ear may grow into and line the mastoid cavity. Preserving a connection between the middle ear and the mastoid cavity provides a permanent air space in the mastoid area.

7. The prepared flap is retracted from the cavity and a fenestra is made over the surgical dome of the horizontal semicircular canal. The bone-dust free, cupula technique, without lavage, a method devised by Lempert, is followed.

8. The muscle flap is replaced over the fenestra and the head of the malleus. Locating the muscle in contact with the head of the malleus provides a physical arrangement by which vibrations of the drum and the malleus may be transferred by shearing forces, through the muscle, to the fenestra. This has been described by Békésy,[3] and Lempert and Békésy.[9]

9. The flap is secured in place by a single long strip of nonadherent packing (Adaptic, Johnson & Johnson) which is used to further fill the entire mastoid cavity.

10. The single endaural incision is sutured primarily, utilizing the superficial end of the strip of nonadherent packing as a drain. On the sixth day the sutures are removed and the single strip of packing is pulled out through the drain opening, removing all packing from the cavity and allowing the incision to close completely. No further postoperative care is needed.

FIGURE 1.

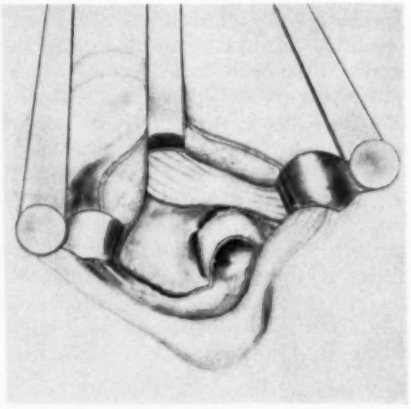
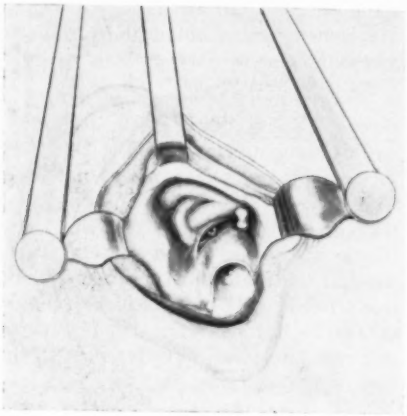


FIGURE 2.



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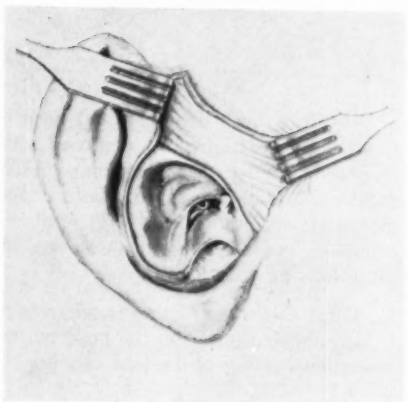

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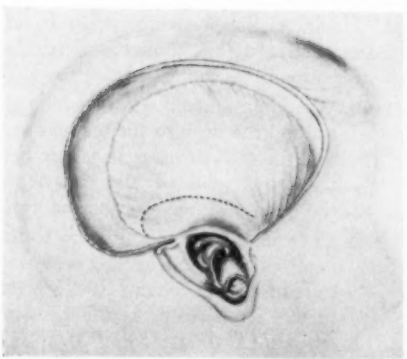

FIGURE 5.

FIGURE 6.

FIGURE 7.

FIGURE 8.

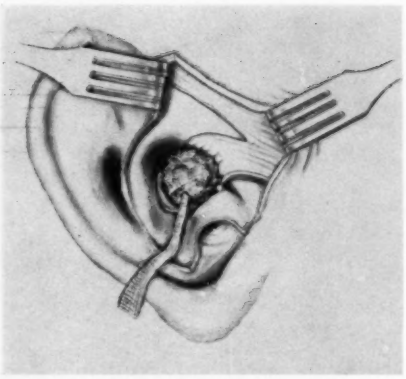

FIGURE 9.

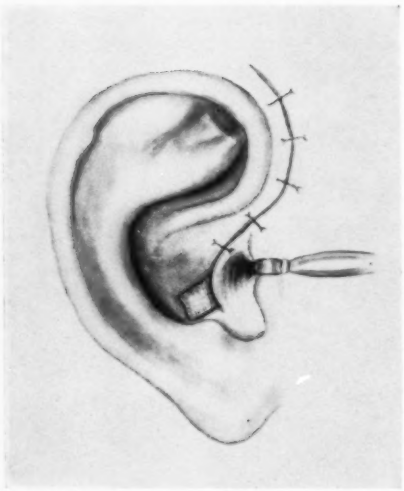

FIGURE 10.

RESULTS

The first two audiograms (figs. 11 and 12) are from patients on whom I performed a classical fenestration on one side and, at a later date, a closed one-stage semicircular canal fenestration on the opposite ear. These patients, with equivalent bone conduction in both ears, and operated on both times by the same surgeon, afford a comparison of the hearing gains obtained by the two methods.

The audiogram shown in figure 15 represents a variation in the technique. In this one patient, the full thickness of the temporal muscle flap was not used. The flap was thinned by splitting off a portion of the surface, resulting in a thinner flap being placed over the fenestra and the head of the malleus. There was a rise above the 30 decibel level only in the high tones. The correlation of this result to physical differences in the flap is not yet clear.

The audiograms represent hearing improvement maintained to the present time.

COMMENT

What has been demonstrated here is that lasting hearing can be restored with a closed fenestration operation. What remains to be determined, before the method is recommended for general acceptance, are the answers to some of the following questions:

1. What thickness of the muscle covering the fenestra and the head of the malleus will give the best hearing?
2. How important are the shearing forces?
3. How can the shearing forces be increased? In this connection, further questions may be asked:
   a. Would a chronic suture looped around the neck of the malleus and tied through the muscle assure better attachment of the muscle to the head and neck of the malleus?
   b. Is attachment of the muscle to the head of the malleus the best way to transmit movement of the drum to the fenestra, or is the head of the malleus too near to its own axis of rotation?

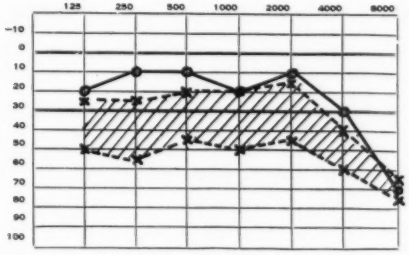

FIG. 11—Audiogram, Woman, age 52.
0—0 Right, classical fenestration, 11-19-57.
x—x Left, closed one-stage fenestration, 11-30-59.

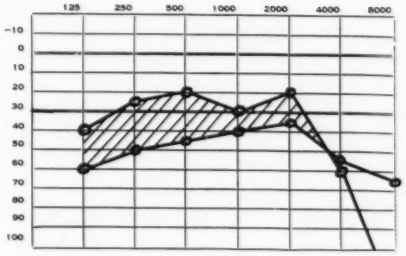

FIG. 14—Audiogram, Man, age 50.
0—0 Right, closed one-stage fenestration, 5-23-60.

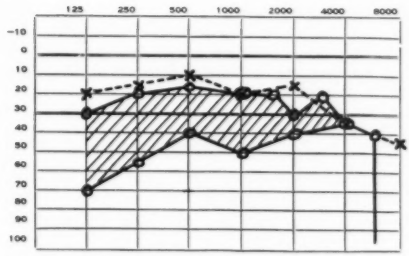

FIG. 12—Audiogram, Woman, age 33.
x—x Left, classical fenestration, 1-11-60.
0—0 Right, closed one-stage fenestration, 3-21-60.

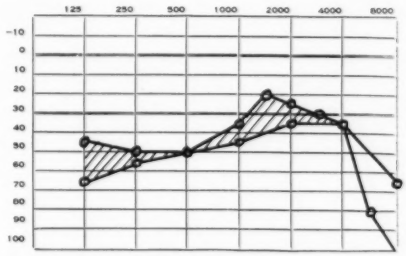

FIG. 15—Audiogram, Woman, age 41.
0—0 Right, closed one-stage fenestration, 6-7-60.

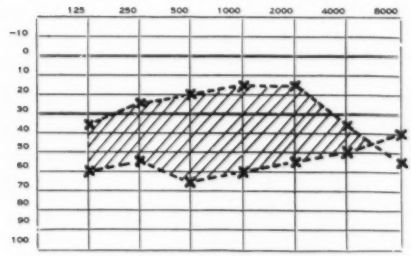

FIG. 13—Audiogram, Woman, age 43.
x—x Left, closed one-stage fenestration, 4-4-60.

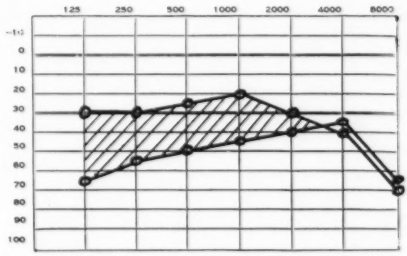

FIG. 16—Audiogram, Man, age 28.
0—0 Right, closed one-stage fenestration, 7-15-60.

Symbols for figures 11 through 16: 0—0, right ear; x—x, left ear; crosshatched area in each audiogram shows the gain following the closed operation.

c. Would contact and adherence of the muscle to the exposed periosteal surface of the external auditory canal skin, where the bony posterior canal wall has been removed, give better vibration and better shearing forces through the muscle to the fenestra?

d. Would a stiffer component of the muscle flap, i.e., the temporal fascia alone, transmit the shearing forces better than the soft muscle?

4. Finally, when more experience has been gained with this method, what will be the results in terms of lasting hearing improvement, as compared with other procedures being used today?

It is hoped that some of these questions can be answered in a future paper.

REFERENCES

1. Bárány, R.: The modern treatment of deafness in historical persepective. Quoted by Wilson, T. G.: J Laryng, 68:143-153 (March) 1959.

2. Bauer, Francis: Clinical note. One stage closed fenestration method, using conjunctival graft, J Laryng, 67:56-57 (Jan.) 1953.

3. von Békésy, G.: Description of some mechanical properties of the organ of Corti, J Acoust Soc Amer, 25:770-785 (July) 1953.

4. Garson, Philip: Otosclerosis: a closed method of fenestration, J Laryng, 66:65-70 (Feb.) 1952.

5. Holmgren, Gunnar: The surgery of otosclerosis, Ann Otol, 46:3-12 (March) 1937.

6. Jenkins, G. J.: Otosclerosis; certain clinical features and experimental operative procedures, Trans Internat Cong Med, 1913, London, sec. 16, pt. 2, Otol, p. 609.

7. Kos, Clair M.: Vein plug stapedioplasty for hearing impairment due to otosclerosis, Trans Amer Otol Soc, 48:157 (March) 1960.

8. Lempert, Julius: Improvement of hearing in cases of otosclerosis: a new, one stage surgical technique, Arch Otolaryng, 28: 42-97 (July) 1938.

9. Lempert, Julius, and von Békésy, Georg: Improvement of sound transmission in the fenestrated ear by the use of shearing forces, Laryngoscope, 69:876-883 (July) 1959.

10. Sourdille, Maurice: New technique in the surgical treatment of severe and progressive deafness from otosclerosis, Bull NY Acad Med, 13:673-691 (Dec.) 1937.

11. Suggit, Stephen: Closed one-stage fenestration, Med J Aust, 1:601-603 (April) 1955.

12. Wilson, T. G.: The modern treatment of deafness in historical perspective, J Laryng, 68:143-153 (March) 1959.

DISCUSSION

MERLE LAWRENCE, PH.D., Ann Arbor, Michigan: Dr. Rambo is to be congratulated not only for his original thinking and surgical acumen but for his continued efforts to base surgical procedure for deafness upon established acoustic and physiologic principles. He has, in this paper, given us a very interesting dialog, cleverly pointing out the status of middle-ear surgical treatment as it stands today in the shadow of similar surgical techniques of the past. We see today a continuous parade of techniques, all proposed to accomplish the same thing—the re-establishment of an adequate sound-conduction pathway to the inner ear. But there is more than just this mechanical principle to satisfy; the procedure must be based upon the soundest physiologic principles.

I suspect that if we compare several types of operations as to their ability to satisfy these principles, we may find the reason for this parade of techniques. A brief comparison of the Lempert fenestration, the stapes substitution operations, and Dr. Rambo's modification may serve this purpose. Let us consider the acoustic accomplishments of these various operations. The conventional fenestration operation leaves the flap-covered fenestra exposed to the air-borne sound while the round window is protected from this sound by the drum membrane. This situation results in a residual loss of energy transfer brought about by lack of the transformer mechanism of the middle ear and gives average hearing results around 25 decibels below normal.

The operations which substitute some prosthesis for the crura of the stapes and some substance that promotes a cicatricial membrane across the oval window to substitute for the footplate can theoretically bring results back up to the normal line. This, of course, is because the transformer mechanism is maintained and the ear operates in a normal manner.

Dr. Rambo tells us that in his modification of the conventional fenestration operation he has taken advantage of the presence of the head of the malleus; laying his muscle flap across it so as to give a communication between the drum membrane and the new fenestra. This, no doubt, helps make up for the lack of transformer action and so brings hearing well up above the 25 db loss level. As suggested by Dr. Rambo, there is no doubt but that this could be improved with possibly a repositioning of the muscle flap or a firmer anchor between the flap and head of the malleus. The conclusion is that this operation makes up acoustically for that which is lacking in the conventional fenestration and approaches the ideal transformer substitution of the prosthesis operations.

Now let us consider the physiologic principles. The conventional fenestration involves the excavation of the mastoid cavity and enlargement of the external canal to a disproportionate extent. The positioning of a skin flap which exposes this cavity to the external environment necessitates, in many instances, frequent care and prevents the patient from swimming and engaging in other water sports.

On the other hand the presence of an artificial prosthesis in place of the stapes is not the soundest physiologic procedure that could be followed. It is always preferable to use homologous tissue in an operation rather than to substitute a prosthetic system; mainly because without life these devices, even without giving rise to a foreign body reaction, tend to change the shape and function of normal tissue in such a way that the artificial device becomes less useful. Secondly, exposure of the vestibule and its structures to the gross manipulations of a surgeon subjects these structures to possible damage and subsequent infiltration by connective tissue or bony overgrowth. From what I can gather about the follow-up course of both a stapes and a fenestration operation, the postoperative vertigo is about the same in both. In the case of the stapes operation, however, this may depend upon the constitution of the patient and upon the amount of manipulation that is undertaken at the time of surgery.

If we now look at Dr. Rambo's operation we find that the objections, on a physiologic basis, of the fenestration have been removed. There is still a little more excavation of bone than in the stapes-substitution operation but there is no longer the cavity.

There is also the very great advantage of Dr. Rambo's operation in that it is based on the long-tried fenestration which in the past has given permanent good-hearing results. Dr. Rambo's operation should give the same results with even better hearing—approaching the normal level, without any fear of the future fate of a prosthetic device or future loss of hearing due to the degeneration of the inner ear.

But I strongly suspect that an important determinant in choice of operation lies in the ease with which it can be done. The earlier fenestration operation was not easy to perform, and there were no where near as many fenestration surgeons as there are stapes surgeons today.

As far as ease of surgical approach is concerned Dr. Rambo's present proposal is still the fenestration of the horizontal canal. This, as already observed, requires more skill than laying back the drum membrane to wiggle or remove the stapes where little if any bone excavation is necessary. But this alone should not determine the choice of an operation. If the ear of a friend of mine needed surgery, I would certainly send him to the most skilled ear surgeon I could find, and that would mean one that would be capable of performing a fenestration operation. So, for our concern here, the amount of skill required to perform the operation should not be considered as the determining criteria.

I personally have talked with two of these patients in Dr. Rambo's offices. Both of these patients were well pleased. They had a normal external canal with a normal drum membrane, and the scar was hardly visible. Both had had a conventional fenestration in one ear and the Rambo modification in the other. The results of all four operations were excellent. The patients carried on normal conversation with unaided hearing, and both were particularly pleased with the Rambo modification in that that ear was perfectly normal in appearance and for swimming and water sports. I tested these patients with whispered voice and if it had not been for an audiometric examination

which I gave them, they would have impressed me as individuals with normal hearing.

In conclusion let me say that I feel this advance of Dr. Rambo's is a most exciting one. It is obvious that the parade of techniques that we are seeing is precipitated by the fact that various surgeons do not really agree with what other surgeons are doing; there has been no procedure until now that stands out as the final answer. There is the reservation in everyone's mind that sooner or later something may happen to these prosthetic substitutes. As a matter of fact, it should be of growing concern that with the greater number of operated patients more and more are finding that somethings does happen to this prosthesis, if nothing more than its coming loose and rattling around in the middle ear. Dr. Rambo's operation is an inspiration, and it should stand out above all the others. I have pointed out its advantages in both the physiologic area and acoustic area. This leaves only the problem of the extra skill required to perform this type of operation over that of a stapes operation. I do not believe that any surgeon should risk the permanence of the patient's hearing on the basis that it is easier to perform one kind of operation than it is another.

For myself, I have now found the answer to the question as to what kind of an operation I would have if I had otosclerosis. I would have Dr. Rambo's closed-cavity, semicircular-canal fenestration.

TRAUMATIC INTRACRANIAL VASCULAR LESIONS PRODUCING LATE MASSIVE NASAL HEMORRHAGE

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and
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BY INVITATION
AAGE E. NIELSEN, M.D.
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HEMORRHAGE from the vessels that normally supply the nasal cavity has been thoroughly discussed from time to time in the medical literature. Articles by Ogura and Senturia[11] and Hallberg[7] have been particularly instructive, since they are based on studies of rather large numbers of cases. An article by Silverblatt[15] is quite impressive. In it he recommends ligation of the anterior ethmoid and sphenopalatine arteries as indicated through an external frontoethmoid incision. Ethmoidectomy is performed before ligating the sphenopalatine artery near the foramen. Others have recommended ligation of the external carotid artery in the neck or the internal maxillary artery through the maxillary sinus instead of the sphenopalatine artery.

The information contained in these and other easily available articles combined with the experience, skill and judgment of the modern otolaryngologist should produce a satisfactory result in most cases.

This paper is not concerned with further discussion of hemorrhage from this source. Rather it is the purpose of this paper to call attention to a certain rarely reported, often fatal, clinical entity, the occurrence of which is apparently not widely known. This entity is characterized by attacks of massive nasal hemorrhage as a result of trauma from skull fracture to the intracranial portion of the internal carotid artery. While the nasal hemorrhage may occur at the time of the injury, it has been recorded more often from several days to a number of months later. There is usually some visual impairment and often total blindness on the affected side. This may be due to pressure on, or laceration of, the optic nerve, or to thrombosis and occlusion of the ophthalmic artery. There is often evidence of involvement of the other cranial nerves.

From the evidence obtained with arteriography, surgical exploration and postmortem examination, it appears that following a tear in the internal carotid artery, a false aneurysm is formed. This may vary from 5 millimeters to several centimeters in diameter, and it tends to erode bone and dissect soft tissue. When the wall of the sphenoid sinus is eroded through, rupture of the aneurysm results in massive nasal hemorrhage through this sinus. In certain other cases the route of exit is through the superior orbital fissure and into the nasal cavity through its lateral wall.

On April 9, 1956, I was asked by Dr. L. E. Beeuwkes to see a 64-year-old man who had been having recurring attacks

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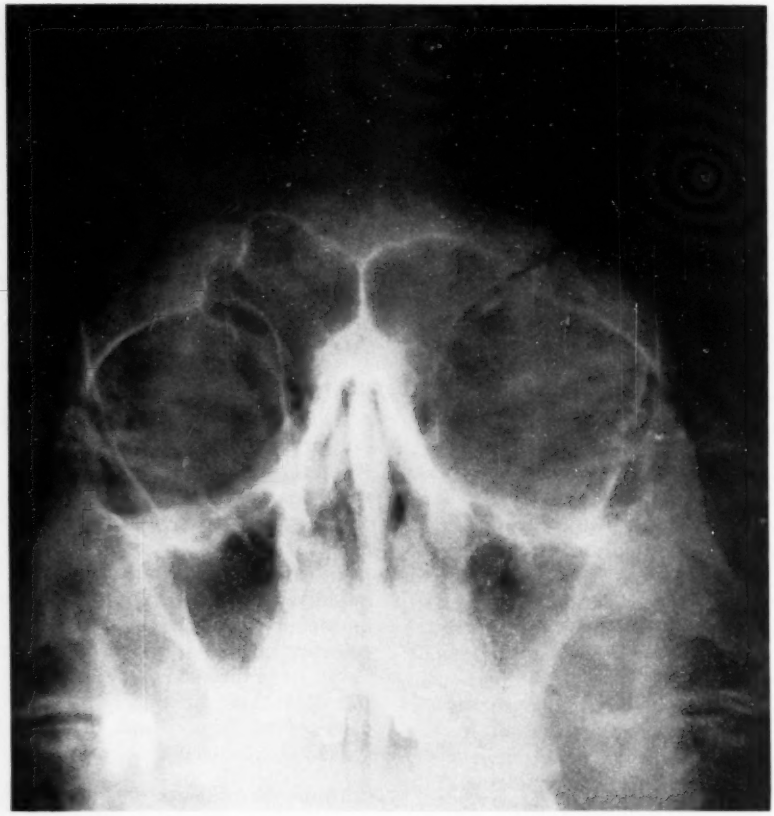

FIG. 1—Fracture left frontal bone and orbit. Also original operative defect.

of bleeding from the left side of his nose for about six weeks. The attacks had grown increasingly severe. On examination, the nasal cavity appeared to be relatively normal and no bleeding point could be seen. An attempt to initiate bleeding was unsuccessful. Submucous resection of the nasal septum had been carried out a number of years previously.

The patient had been injured in an automobile accident in June 1955, ten months previously, and at that time a craniotomy had been performed, with removal of bone from the left frontal, parietal and temporal regions. There was a scar 4 inches long over this area and brain pulsations were visible. The left eyelid was closed and there was total blindness in the left eye. Roentgenograms of the sinuses and skull showed the large operative defect, with a fracture line extending into the superior aspect of the left optic orbit and the left lateral aspect of the frontal sinus. There was evidence of low grade inflammatory changes in the ethmoid cells and maxillary antrum on the left (fig. 1).

One week later the patient was admitted to Woman's Hospital because of further bleeding, weakness, dizziness and anemia. At this time examination of the blood showed a hemoglobin determination of 8 gm.; red blood cells, 2,970,000; white blood cells, 9,400. The nasal bleeding was controlled by packing, the blood loss was replaced by transfusions, and the patient was dismissed on April 25, nine days after admission.

On May 1, six days later, he was readmitted to the hospital because of massive nasal hemorrhage. It was now quite evident that the bleeding was of a serious and dangerous nature. The neurosurgeon who had performed the craniotomy on him was contacted by telephone, and it was his opinion that the massive hemorrhage was not associated with the skull fracture. Consequently, on May 4, three days after admission, after having replaced the blood loss with 1500 cc. of blood, the following operation was carried out.

Under pentothal sodium anesthesia with an intratracheal tube in place, the left anterior ethmoid artery was ligated through a fronto-ethmoid incision. Ethmoidectomy was then carried out, and the left sphenopalatine artery was ligated near the lateral wall of the nose. Following the operation there was slight oozing of blood from the operative site for several days, but the patient was dismissed from the hospital on the fifth postoperative day in good shape. There was no more bleeding for fifteen days, at which time his local physician packed the left side of his nose for moderate hemorrhage. The following night a massive nasal hemorrhage occurred which could not be controlled by his local physician, and he died from exsanguination before an ambulance could reach his home. I personally performed a limited postmortem examination but no illuminating evidence was found. Some old blood clots were found on the lateral wall of the nose. The skull was not opened.

On October 6, 1959, I was asked by Dr. Edward Gates, a neurosurgeon and one of the coauthors of this paper, to see a 20-year-old man who was having recurring attacks of bleeding from the left side of his nose. On examination of the left nasal cavity, there was much evidence of infection of the sinuses. There was also present a moderate amount of recent and old blood.

Two months previous to the examination, the patient's scalp and face had been lacerated and the left frontal bone fractured in an automobile accident (fig. 2). Dr. Gates had performed a craniotomy at that time. The patient was unconscious for the first four days after the accident and had amnesia for the first two weeks.

There had been total loss of vision in the left eye since the accident.

On October 13, seven days after the first observation, he was admitted to Woman's Hospital for drainage of an abscess associated with a localized osteomyelitis of the frontal bone and also for observation of the nasal hemorrhage. It was clear that the basic pathology in this case was almost identical with that in the case previously discussed. However, since the source of the bleeding was not known, treatment could not be planned with any assurance of success.

On October 26, thirteen days after admission, a sudden hemorrhage occurred and 1500 cc. of blood was lost from the nose within a few minutes. The pupils were dilated, and the patient could not see light. All the other signs and symptoms of massive blood loss were present. Blood pressure was 0/90. The patient was put in shock position, blood replacement was started, and in twenty minutes his condition had improved and his vision returned.

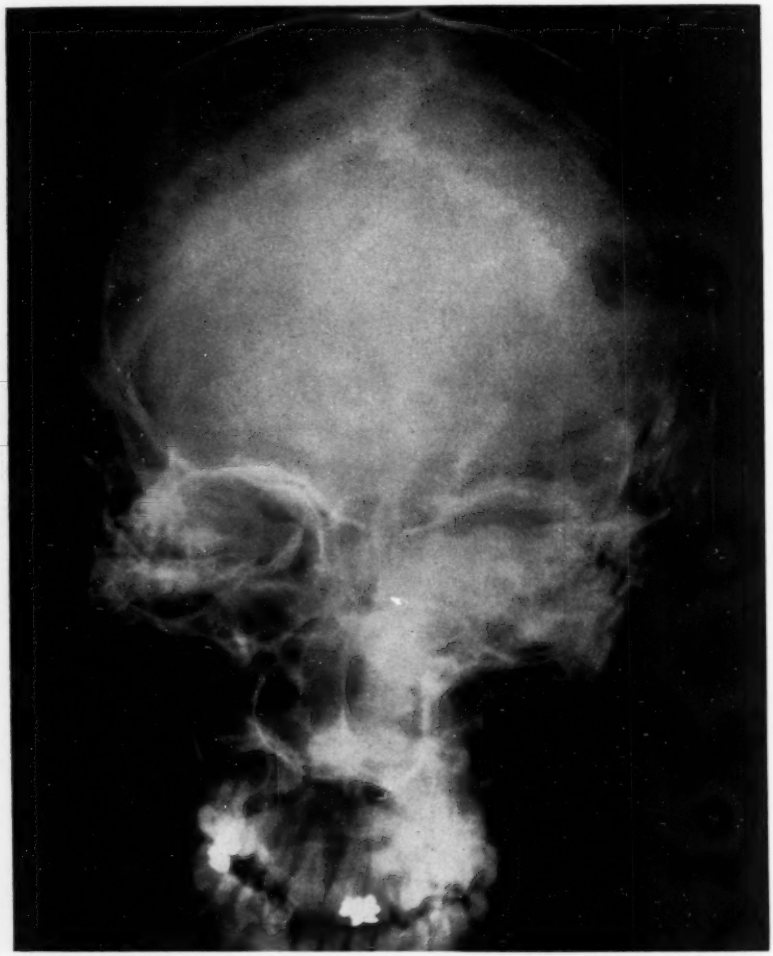

FIG. 2—Fracture left frontal bone and operative defect.

This incident, of course, made immediate action imperative. The next day the anterior ethmoid artery was ligated through a fronto-ethmoid incision. Ethmoidectomy and operation on the sphenoid sinus was carried out, and much infected material was removed. On the lateral wall of the nose, old blood clots were seen. When their gentle removal was begun, a massive hemorrhage, much greater than any I have ever seen, occurred. Blood poured from both sides of the nose and the mouth; in a matter of seconds the patient was in a state of severe shock. Neither pulse nor blood pressure could be recorded. With digital

pressure through the nostril and through the skin incision, I was able to control the hemorrhage reasonably well. But for the alert action of the team of anesthetists, headed by Dr. George C. Frederickson, I am certain the patient would have died. During this immediate emergency and the remainder of the operation, 2500 cc. of blood were transfused. Actual digital pressure was replaced by tight gauze packing, which was held in place by firm digital pressure.

Dr. Gates, who was near at hand, promptly exposed the left common carotid artery and placed umbilical tape around it but did not tie it. He then exposed and ligated the left external carotid artery. On release of the digital pressure on the nasal packing, bleeding was profuse. Dr. Gates then ligated the left common carotid artery, but when the digital pressure was released, bleeding was again profuse. He then removed the ligature from the left common carotid artery, exposed the right common carotid artery, placed tape loosely around it, and exposed the right external carotid artery. With both external carotid arteries ligated, when pressure was released on the nasal packing, bleeding was profuse. Dr. Gates then temporarily oc-

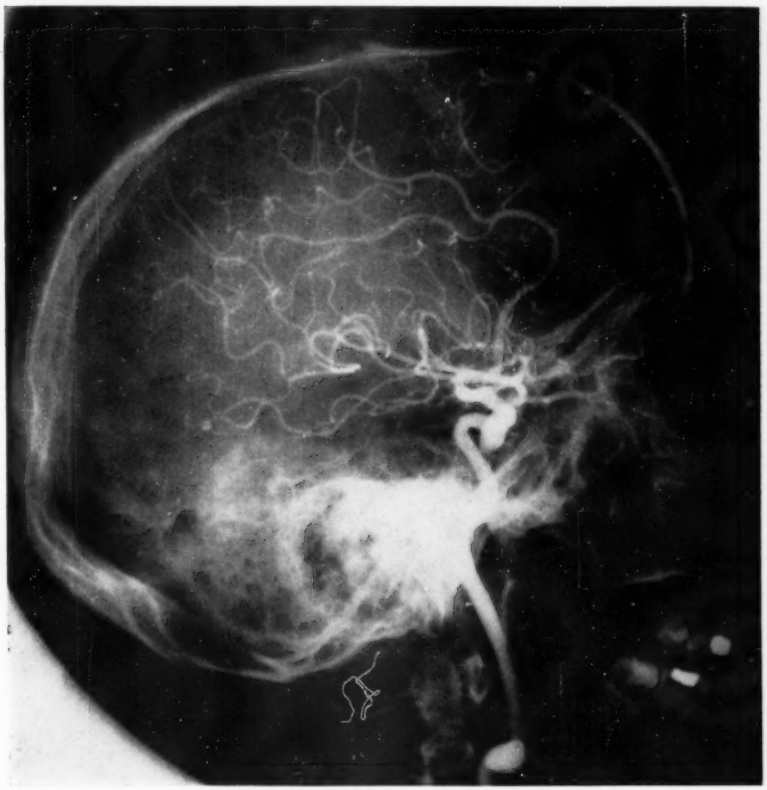

FIG. 3—Right internal carotid arteriogram. Normal.

cluded both common carotid arteries, but when the pressure on the nasal packing was released, bleeding was still profuse. The nasal cavity was then packed extremely tightly with gauze, the wound closed, tracheotomy performed, and the patient returned to his room.

On November 3, 1959, Dr. Aran S. Johnson passed a polyethylene catheter (no. 36) through the left brachial artery to the aorta, and 25 cc. of 70 per cent Urokon was injected. The films showed visualization of the vertebral, basilar and posterior cerebral arteries. There was no visualization of the internal carotid or any of its branches.

On November 9, 1959, contrast material was injected into the internal carotid arteries after percutaneous puncture, and the films showed the right side to be normal (fig. 3). On the left, the anterior and middle cerebral arteries appeared to be normal while the ophthalmic artery was densely opacified. There was a very significant finding of an abnormal collection of the contrast mate-

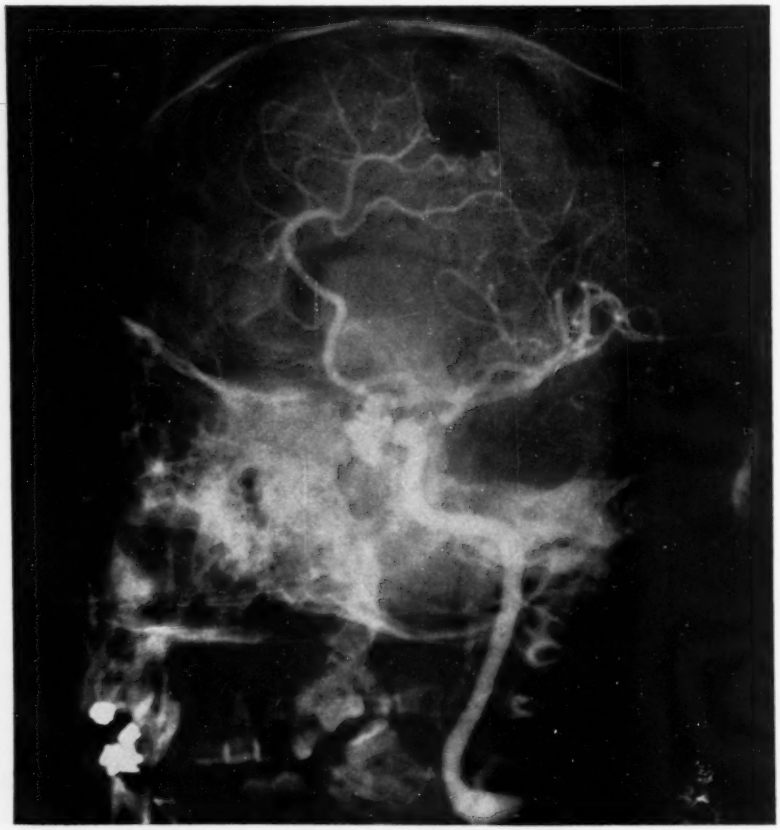

FIG. 4—Left internal carotid arteriogram. Aneurysm at level of parasellar area and no filling of ophthalmic artery.

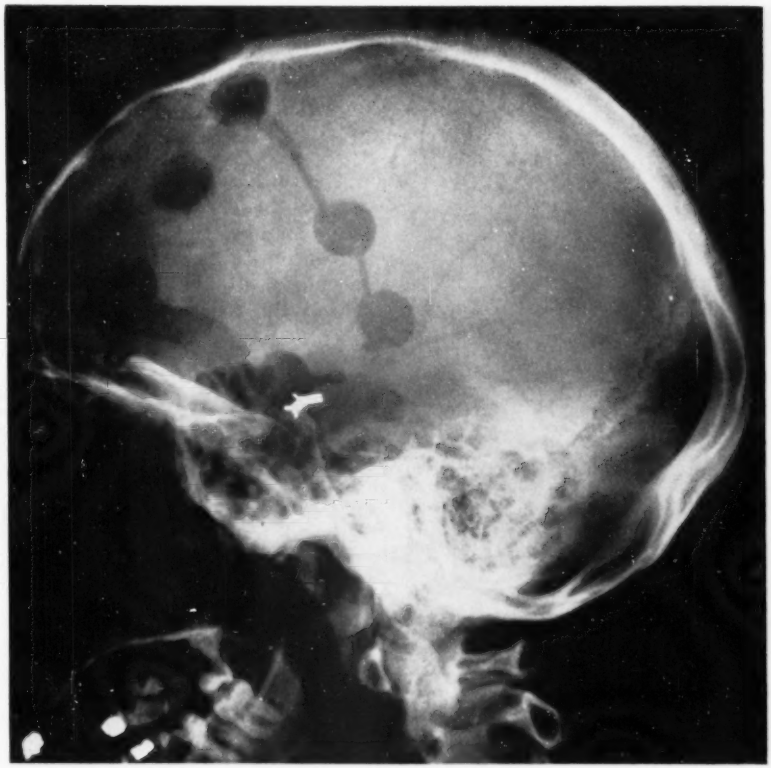

FIG. 5—Clips on left internal carotid artery.

rial at the level of the parasellar area (fig. 4). This was thought to represent a false aneurysm.

On November 18, 1959, Dr. Gates and Dr. Aage Nielsen removed a large frontal bone flap, and Dr. Nielsen incised the dura and retracted the frontal lobe of the brain. He then placed two silver clips on the left internal carotid artery between its emergence from the cavernous sinus and its bifurcation into the anterior and middle cerebral arteries (fig. 5). The left common carotid artery was then ligated by Dr. Gates, the external carotid artery having been ligated at the previous operation. The gauze pack was then removed from the nose, and the left blind eye, which had developed marked corneal ulceration and infection, was enucleated by Dr. J. C. Gemeroy (fig. 6).

Complete hemiplegia of the right side occurred a few hours after the operation, but this was thought by Dr. Gates to be due to operative trauma to the brain. This proved to be the case, since it cleared almost completely in several

FIG. 6—One month after final operation. Scars from craniotomy, fronto-ethmoid incision, ligations of cervical vessels and tracheotomy.

days. The only residual effect is difficulty when writing with the right hand.

Eleven months after the operation there has been no more bleeding. Dr. Gates tells me, however, that there has been an exacerbation of osteomyelitis of the skull.

A search of the medical literature was made for case reports similar to ours, and nineteen were found distributed among thirteen articles. With the addition of our two cases, the twenty-one reports were studied as a group.

Of the reports in the English language, six were from England and three, including our two cases, from the United States. Five were in French, three in German, two in Spanish, and one each in Japanese and Russian.* The earliest report was written in 1895, and single cases were reported in 1928 and 1939. Five cases were reported in the early nineteen forties and 13 since 1951 (table 1). The marked increase in reports of this entity during the past decade is no doubt due largely to the development of arteriography. Of the nine patients who had carotid arteriograms, eight were reported in the past ten years.†

According to Cairns,[2] arteriography was introduced by Moniz of Portugal in 1927. However, it has been widely used for only about ten years.

Fourteen of the patients studied were men and four were women. The sex of three was not recorded. The youngest was 8 years of age and the oldest 64. The average age was 26.7 years.

The head injuries involved vehicles in thirteen cases, falls from heights in three, and in five the cause of injury was not stated.

Motorcycle accidents were responsible for five injuries, automobiles for four, trains for two, and a bicycle for one. One injury was recorded as having oc-

*The authors wish to express sincere gratitude to the Staff of the Library, College of Medicine of Wayne State University, for many favors including the obtaining of photostatic copies of articles from the National Library of Medicine, Washington, D. C.; to Otto Boneta, M.D.; Mr. Joseph Dereppe; Mrs. Janine Perdue; Maxim P. Melnik, M.D.; and Dr. Armand J. Abrams, Administrative Assistant of Kresge-Hooker Science Library Associates, for translations into English from the various foreign languages.

†An interesting report was found too late to be included in this group. The patient died from massive epistaxis five months after skull fracture. No vessel ligation had been carried out.

Seftel, Daniel M.; Kolson, Harry, and Gordon, Benjamin S.: Ruptured intracranial carotid artery aneurysm with fatal epistaxis, Arch Otol, 70:52-60 (July) 1959.

TABLE I

CASE NO.	AUTHOR	LANGUAGE	DATE REPORTED	AGE	SEX	CAUSE OF INJURY	ONSET OF EPISTAXIS AFTER INJURY IN WEEKS
1	Guibert[6]	French	1895			Not recorded	1
2	Birley & Trotter[1]	English (England)	1928	23	M	Auto accident	6
3	Davis[4]	English (England)	1939	Soldier	M	Not recorded	8
4	Jaques[9]	French	1940	29	F	Fall from bicycle	8
5	Jacques	French	1940			Not recorded	3
6	Cairns[2]	English (England)	1942	32	M	Motorcycle accident	11
7	Cairns	English (England)	1942	19	M	Motorcycle accident	12
8	Cairns	English (England)	1942	17	M	Motorcycle accident	Immediate
9	Rousseau & Spillman[13]	French	1951	28	M	Fall on head from height of 7 meters	Immediate & 16
10	Rousseau & Spillman	French	1951	23	F	Fall of 3 meters from moving truck	Immediate & 7
11	Romanenko[12]	Russian	1951	8	M	Not recorded	Not stated
12	Kinley & Leighninger[10]	English (U. S.)	1952	42		Auto accident	Not stated
13	Hamilton[8]	English (England)	1953	20	M	Motorcycle accident	Immediate & repeated
14	Schlosshauer & Vosteen[14]	German	1954	46	M	Motorcycle accident	4
15	Schlosshauer & Vosteen	German	1954	12	F	Traffic accident	6
16	Denecke & Hartert[5]	German	1954	15	M	Fall from window	4
17	Christensen[3]	Spanish (S. Amer.)	1955	26	F	Struck by subway train	8
18	Christensen	Spanish (S. Amer.)	1955	27	M	Hit by hand rail on locomotive	Immediate & 9
19	Takeda, R. & Kawakita[16]	Japanese	1955	31	M	Not stated	Immediate
20	Weaver, Gates & Nielsen	English (U. S.)	1960	64	M	Auto accident	40
21	Weaver, Gates & Nielsen	English (U. S.)	1960	20	M	Auto accident	8

TABLE II

CASE NO.	LOSS OF VISION ONE EYE	LOSS OF VISION BOTH EYES	OTHER CRANIAL NERVES INVOLVED	BRUIT OR MURMUR HEARD	STOPPED OR DIMINISHED BY PRESSURE ON COMMON CAROTID ARTERY
1	Total				
2	Moderate		3, 4, 6	Right front of head	
3	Total	Total		Right temporal fossa	
4			3, 5		
5					
6	Marked		1, 5	Right side of head	Yes
7	Total	Total	1	Front of head and face	Yes
8	Total		3	Left temporal region and most of head	Yes
9	Total		5		
10	Moderate	Moderate			
11	Total			Present	Yes
12			3, 5		
13	Total		1, 5	Over left eye	Yes
14	Total		1		
15	Total				
16					
17	Moderate			Frontotemporal	Yes
18	Moderate				
19					
20	Total		3		
21	Total		3		

curred in a traffic accident but the type of vehicle involved was not stated.

The onset of epistaxis occurred immediately after the injury in six patients, and one died at that time. Of the five remaining patients, bleeding did not recur in three until seven, nine and sixteen weeks later, respectively.

In the other fifteen cases reported, the earliest bleeding occurred one week following injury, and one patient did not complain of it for about forty weeks.

The usual time for the onset, however, was between the sixth and twelfth week (table I).

One or more of the first six cranial nerves were involved in eighteen of the patients. Five had partial loss of vision in one eye; in eleven, the loss was total. Two of the eleven later developed total loss in the other eye (table II).

Eleven patients had involvement of the other five nerves either singly or in various combinations (table II). While fracture of the skull may cause direct trauma to certain of these nerves, the anatomical relationship of most of them to the cavernous sinus and the internal carotid artery is easily accountable for their involvement (fig. 7).

A bruit or murmur was heard in the frontal or temporal region in eight of the patients, and in six of these it could be stopped or diminished by pressure on the common carotid artery.

Fracture of the frontal bone of the skull was much more common than fracture of any other bones. However, some of the patients had fractures of the temporal, parietal and sphenoid bones in various combinations with and without fracture of the frontal bone.

Carotid arteriography was carried out on nine patients. No abnormality was demonstrated in two. It is of interest that at autopsy, one of these showed a tear in the carotid artery but no aneurysm. Seven of the arteriograms showed an aneurysm of the internal carotid artery varying in diameter from 5 mm. to much larger (table III).

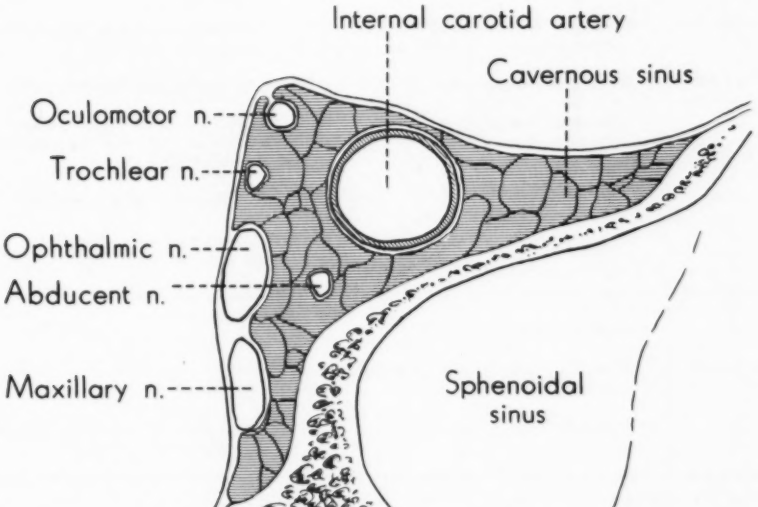

FIG. 7—Oblique section through right cavernous sinus (After Gray, Henry: Anatomy of the Human Body, ed. 22, p. 898.)

TABLE III

CASE NO.	SKULL ROENTGENOGRAM	FINDINGS ON NINE PATIENTS HAVING CAROTID ARTERIOGRAMS
1	Not recorded	
2	Fracture parietal & temporal bones	
3	Negative	
4	Not recorded	
5	Not recorded	
6	Fracture both orbits and *frontal* sinus	*Aneurysm* int. car. art.*
7	Destruction of anterior part of floor of sella	
8	Fracture roof of orbit, *frontal* and temporal bones	
9	Not recorded	
10	Fracture orbital border	
11	Negative	
12	Depressed comminuted fracture *frontal* bone	*Aneurysm* infraclinoid portion int. car. art.
13	Fracture *frontal* sinus, floor of sella, anterior cranial fossa	Saccular *aneurysm* intracavernous portion int. car. art.
14	Fracture *frontal* bone	No abnormality demonstrated
15	Fracture *frontal* bone and sphenoid sinus	Large extradural pear shaped *aneurysm* int. car. approximating sphenoid sinus
16	Not recorded	No abnormality demonstrated
17	Fracture sella	*Aneurysm* 8 mm. diameter int. car. art.
18	Not recorded	*Aneurysm* 5 mm. diameter int. car. art.
19	Not recorded	
20	Fracture parietal & *frontal* bone and orbit	
21	Fracture *frontal* bone	*Aneurysm* int. car. art. No filling of ophthalmic artery

* int. car. art. = internal carotid artery.

TABLE IV
SURGICAL TREATMENT, CAUSE OF DEATH AND AUTOPSY FINDINGS OF TEN PATIENTS

CASE NO.	TREATMENT	CAUSE OF DEATH	AUTOPSY FINDINGS
1	None	Epistaxis	*Aneurysm*, left internal carotid artery within cavernous sinus
4	None	Meningitis and osteomyelitis	*Coagulant* in sphenoid adherent to wall of cavernous sinus
7	First ligation right common & external car. art., then series of extra & intracranial ligations	Epistaxis	Erosion floor of sella, defect in wall of int. car. art. leading into *aneurysm* 2 cm. in diameter in sphenoid sinus
8	Ligation int. car. art.	Epistaxis 3 mos. later	Defect in wall of cavernous portion int. car. art. leading into *aneurysm* 2 cm. diameter in roof of sphenoid sinus
10	Craniotomy showed large aneurysm in left cavernous sinus occupying entire sella & compressing both optic nerves	Epistaxis 2 days later. Also intracranial hemorrhage	None
14	Arteriogram only	Epistaxis 2 days later; "like explosion"	Pea sized *rupture* int. car. art. near sphenoid sinus
15	Left in. car. art. ligated in neck. Ligature removed in 7 hrs. after hemiplegia. Aneurysm opened & packed with muscle.	Died 2 days later without regaining consciousness	*Aneurysm* of int. car. art. had eroded wall of sphenoid
18	Partial ligation int. car. art.	Became cyanotic during arteriogram. Died 2 days later still unconscious	None
19	None	Immediate epistaxis after injury	*Blood clot* over skull fracture extending from cavernous sinus into sphenoid
20	Ligation left anterior ethmoid & sphenopalatine arteries	Epistaxis 2 weeks later	Limited to nasal cavity. Negative

Eleven of the patients recovered, while ten died.

Of the ten patients who died, seven died of epistaxis, one died of meningitis resulting from osteomyelitis of the skull; one died following craniotomy and packing of the aneurysm with muscle, and one died following the arteriogram procedures. Eight of the ten had no permanent ligation of the neck vessels, although one had a partial ligation of the internal carotid artery, and another, in whom the internal carotid artery had been ligated, had the ligature removed after seven hours because of hemiplegia. Four of this group had no surgical treatment at all except the arteriogram that preceded the death of one. Two patients died of epistaxis in spite of neck ligations. One had ligation of the internal carotid, and the other, ligation of the common and external carotid arteries as well as further intracranial and extracranial ligations.

Autopsies were performed on eight patients. Two of these were limited to the nasal cavity; while one revealed nothing of value, the other disclosed coagulant in the sphenoid sinus adherent to the wall of the cavernous sinus.

Four of them showed definite aneurysms of the internal carotid artery, and in three of these the defect in the wall of the artery leading into the aneurysm could be demonstrated.

In one case the tear in the internal carotid was the only finding, and in another the only finding was a blood clot in the region of the sphenoid and cavernous sinus (table IV).

All of the patients who survived had ligations of the carotid arteries in the neck. This involved a variety of sequences and combinations. In all cases except one, the flow of blood through the cervical portion of the internal carotid artery was eventually stopped either by ligation of that artery or ligation of the common and external carotid arteries. The only patient who had ligation of only the common carotid artery continued to bleed, but hemorrhage was controlled by packing the sphenoid sinus (table V).

The blood flow through the cervical portion of the internal carotid artery had been completely and permanently stopped in six patients who had additional surgery on the intracranial vessels. Four of these had clips placed on the intracranial portion of the internal carotid artery above the aneurysm. One of the four had recurrence of bleeding until the ophthalmic artery was clipped. Collateral circulation through the external carotid artery from the opposite side made this necessary. In a fifth patient, the aneurysmal sac was reached through a fronto-ethmoid incision and Topostasin was injected on the lateral wall of the nasal cavity.

In the sixth patient the superior ophthalmic vein was sectioned. While two of the patients who recovered had slight residual effects from hemiplegia, there were no major sequelae from the surgical treatment.

CONCLUSIONS

From our experience and the study of the cases reported by others, the following conclusions have been reached.

Severe epistaxis occurring within ten months following an important head injury should be suspected of originating from a defect in the intracranial portion of the internal carotid artery. If the blood loss is 500 to 1500 cc. in a few minutes, if there is blindness in an eye from the injury, if there is involvement of certain other cranial nerves, and if a bruit or murmur can be heard over the front or side of the head, such a source

TABLE V
TREATMENT AND RESULTS FOR THE ELEVEN SURVIVING PATIENTS

CASE NO.	TREATMENT	RESULT
2	Clinical diagnosis aneurysm intracavernous portion int. carotid artery. *Internal* and *external* carotid arteries ligated	Well 4 years later
3	Right *common* carotid artery ligated. Bleeding recurred and right *external* carotid ligated	No more bleeding
5	Aneurysm of cavernous portion of internal carotid artery presumed. Right *common* carotid artery ligated. Bleeding continued but controlled by *packing sphenoid* sinus	Recovery
6	Right *internal* carotid artery ligated	Well 7 months later
9	*Common* carotid artery ligated. Bleeding continued. 1½ months later *internal* carotid ligated	Recovery
11	Ligation of *internal* carotid artery. Section of *superior ophthalmic vein*	Recovery
12	*Internal* carotid artery tied in neck. 2 weeks later 2 *clips* placed on intracranial carotid above aneurysm	Well 2 years later
13	Left *internal* carotid artery ligated in neck. Bruit persisted. 4 days later the supraclinoid portion of the internal carotid artery was exposed and *clipped*	Well 21 months later
16	Ligated left *internal* and both *external* carotids. Aneurysmal sac on lateral wall of nasal cavity injected with *Topostasin* through a fronto-ethmoid incision	Recovery
17	Ligated right *common* carotid. Weeks later *internal* carotid ligated in neck and a silver *clip* is placed on the int. carotid distally to ophthalmic artery. Later necessary to clip the ophthalmic artery.	Well 15 months later
21	Ligation *common* and *external* carotid *artery* and *clip* on internal carotid intracranially	Well 11 months later

is almost certain. Death from exsanguination is imminent unless active surgical treatment is instituted promptly.

After bleeding is controlled by packing and the blood is replaced, carotid arteriograms should be obtained. If an aneurysm or leak in the internal carotid artery can be demonstrated, the blood flow through the cervical portion of the internal carotid artery should be stopped. This can be effected either by ligating that vessel or ligating the common and external carotid arteries. The value of preliminary ligation of the common carotid artery is doubtful. Ligation of the common and both external carotid arteries may be chosen when the arteriogram shows normal filling of the ophthalmic artery. As has been mentioned, another method of removing this artery from the circulation is placing a clip on it.

The risk of craniotomy and clipping the internal carotid artery above the defect must be balanced against the risk of fatal hemorrhage from blood flow through the vessels above the aneurysm. If restricted blood flow in these vessels cannot be demonstrated by vertebral arteriograms, it is recommended that the internal carotid artery be clipped.

SUMMARY

Two cases of severe epistaxis resulting from a tear in the intracranial portion of the internal carotid artery have been reported. One patient died from the hemorrhage; the other patient recovered after ligation of carotid vessels in the neck and placing clips on the internal carotid artery above the tear.

Nineteen similar cases have been found in the medical literature. Data from a study of the twenty-one cases have been reported and tabulated and recommendations made for the diagnosis and treatment of this entity.

REFERENCES

1. Birley, J. L., and Trotter, Wilfred: Traumatic aneurysm of the intracranial portion of the internal carotid artery, Brain, 51:184-208, 1928.

2. Cairns, H.: Vascular aspects of head injuries, Lisboa Medica, 19:375-410 (July) 1942.

3. Christensen, Juan C.: Epistaxis par aneurismas carotideos infraclinoideos [Epistaxis due to intraclinoid carotid aneurysms], Acta Neurol Latinoam 1:60-70, 1955.

4. Davis, Edward D. D.: Severe epistaxis, difficult to control, Brit Med J, 721-723 (April 8) 1939.

5. Denecke, H. J., and Hartert, H.: Carotis interna Verletzung mit unstellborem Nasenbluten, geheilt durch intraorterielle Thrombininjektion [Injury of internal carotid artery with uncontrollable epistaxis cured by intra-arterial thrombin injection with experimental contribution], Chirurg, 25:470-472 (Oct.) 1954.

6. Guibert, M.: Aneurisme arteriel de la carotid interne au niveau du sinus caverneu gauche [Arterial aneurysm of the internal carotid at the left cavernous sinus], Ann Oculist (Par) 113:314-318, 1895.

7. Hallberg, Olav E.: Severe nosebleed and its treatment, JAMA, 148:355-360 (Feb.) 1952.

8. Hamilton, J. G.: Massive epistaxis following closed head injury, Guy Hosp Rep, 102:360-367, 1953.

9. Jacques, H.: Epistaxis graves et répétées d'origine caverneuse; complication tardive de traumatismes crâniofaciaux, Rev. Laryng (Bordeaux), 61:233-239 (May) 1940.

10. Kinley, Gordon J., and Leighninger, David S.: Aneurysm of anomalous ophthalmic artery presenting in the sphenoid sinus and simulating an aneurysm of the internal carotid artery on routine arteriography, J Neurosurg, 9:544-547, 1952.

11. Ogura, J. H., and Senturia, B. H.: Epistaxis, Laryngoscope, 59:743-763 (July) 1949.

12. Romanenko, K. M.: Therapy of genuine traumatic pulsating exophthalmos associated with severe nasal hemorrhage, Vestn Oftal, 30:21-23 (July-Aug.) 1951.

13. Rousseau, F., and Spillman, J.: Deux cas d'épistaxis incoercibles avec cécité homolatérale per lésion de la carotide interne intracranienne apres chuts sur la tête, Ann Otolaryng (Par) 68:461-465, 1951.

14. Schlosshauer, B., and Vosteen, K. H.: Zur Diagnostik und Therapie der Carotisblutung nach Keilbunhöhlenfrakturen [Diagnosis and therapy of carotid hemorrhage following fractures of sphenoid sinus], Arch Ohr Nas Kehlpopfheilk, 165:270-277, 1954.

15. Silverblatt, Bernard L.: Epistaxis: evaluation of surgical case, Trans Amer Laryng Rhinol Otol Soc, pp. 330-350, 1955.

16. Takeda, R., and Kawakita T.: Profuse nasal bleeding as symptom of basal skull fracture, Otolaryng (Tokyo) 26:173, 1954.

A NEW TRACHEOSTOMY TUBE

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and
JOHN W. MCMAHON, M.D.
BY INVITATION
ST. LOUIS, MISSOURI

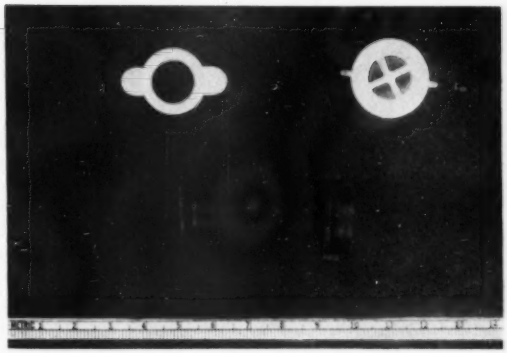

FIG. 1—New plastic tracheostomy tube with circular endotracheal flange on right of tube and flared outer end designed to receive snap-on valve cap to left. The simple one-way valve which permits only inhalation is in the right upper corner of the picture and the plastic disc which can be adjusted over the serrations on the tube for external fixation is in the upper left.

A NEW tracheostomy tube was described by Dr. Robert Kistner in October 1959, at the Surgical Forum of the American College of Surgeons meeting.[1] The tube (figs. 1 and 2) is a straight cylinder of inert polyvinyl acetate, plasticized to a degree of malleability to permit its ready insertion into the trachea.* The inner end of the tube is slightly flared to provide internal fixation against the anterior of the trachea. Along the shaft of the tube are multiple serrations over which a plastic disc may be adjusted against the skin to provide external fixation.

The outer end of the tube is designed to receive a snap-on plastic cap which contains a simple one-way valve (fig. 2). This valve permits inhalation through the stoma, but directs the exhaled air through the larynx, thus maintaining effective cough and normal speech.

The new tube differs from the conventional tube in that the obstructing

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Dr. McMahon is a clinical trainee of the National Cancer Institute.

*Available through George P. Pilling & Son Company of Philadelphia.

Presented as a *New Instrument* at the Sixty-Fifth Annual Session of the American Academy of Ophthalmology and Otolaryngology, Oct. 9-14, 1960, Chicago.

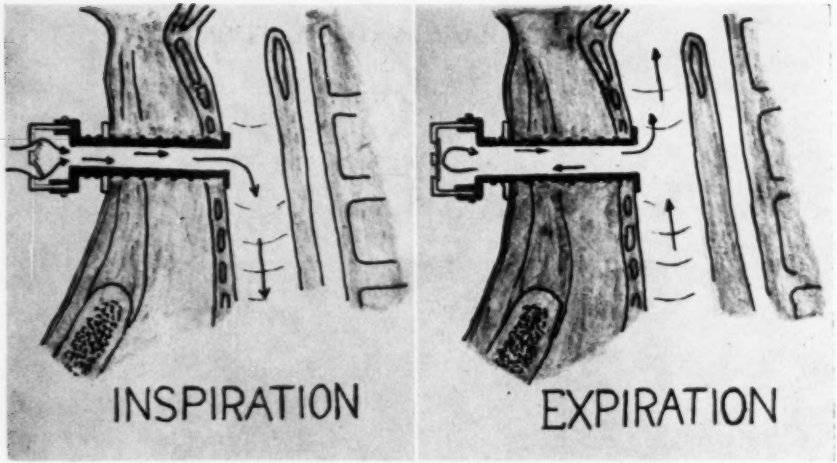

FIG. 2—(Left) Diagram of new tube in situ with attached cup showing function of valve in inspiration. (Right) Diagram of new tube in situ with attached cup showing function of valve in expiration. This permits effective cough and normal speech.

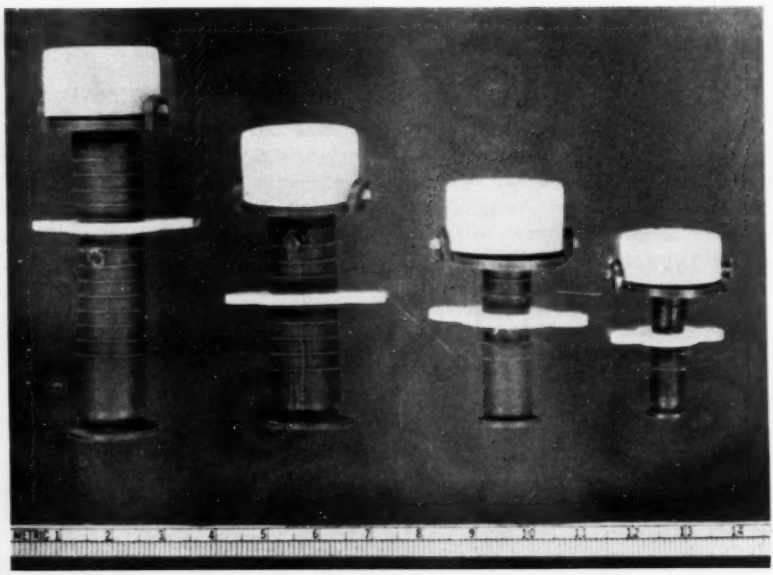

FIG. 3—Photograph of the four sizes of Kistner tracheostomy tubes assembled. On the right is the infant size, next the juvenile size, next the adult size, and on the left the extra long size designed for the occasional individual in whom the added length is required.

intratracheal portion has been essentially eliminated. Secretional material may then be conveyed to the outside in the normal manner.[2]

Two years' experience with this new tube has produced gratifying results. Aspiration is less often needed; secretions are reduced in amount; the incidence of tracheobronchitis is reduced; mucosal trauma is lessened, and the cilia are not destroyed.

The new tube comes in four sizes: infant, juvenile, adult, and extra long to fit the occasional patient in whom basic anatomy or operative edema necessitates its use (fig. 3).

REFERENCES

1. Kistner, Robert L.: Fundamental improvements in design of the tracheostomy tube, Surg Forum, 10:703-704, 1959.

2. Kistner, Robert L., and Hanlon, C. Rollins: A new tracheostomy tube in treatment of retained bronchial secretions, Arch Surg, 81:259-262 (Aug.) 1960.

MODIFIED ERISOPHAKE

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NEW BRUNSWICK, NEW JERSEY

THERE has been increased use of the erisophake in cataract surgery since the introduction of alpha-chymotrypsin. It is therefore important that this instrument is improved to the point where its application is safe and under good control.

The erisophake which I am presenting is different in that the dome is made of glass and is set in a metal rim which is placed in contact with the lens capsule. The advantages of this erisophake are (1) greater accuracy of application, (2) direct visualization of capsule and lens as they rise in the dome of the erisophake, and (3) immediate detection of the separation of lens and capsule from the dome in the event of a break in suction.

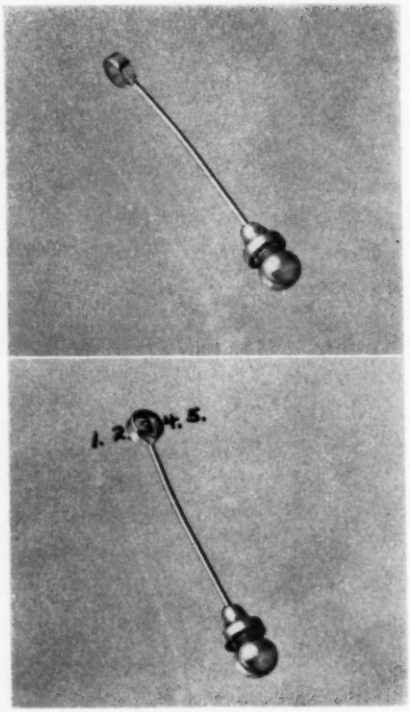

FIG. 1—Modified erisophake. (Top) Side view. (Bottom) Glass dome in metal rim which allows visualization of lens and capsule.

Presented as a *New Instrument* at the Sixty-Fifth Annual Session of the American Academy of Ophthalmology and Otolaryngology, Oct. 9-14, 1960, Chicago.

DE-EPITHELEIZER

WENDELL A. WELLER, M.D.
DENVER, COLORADO

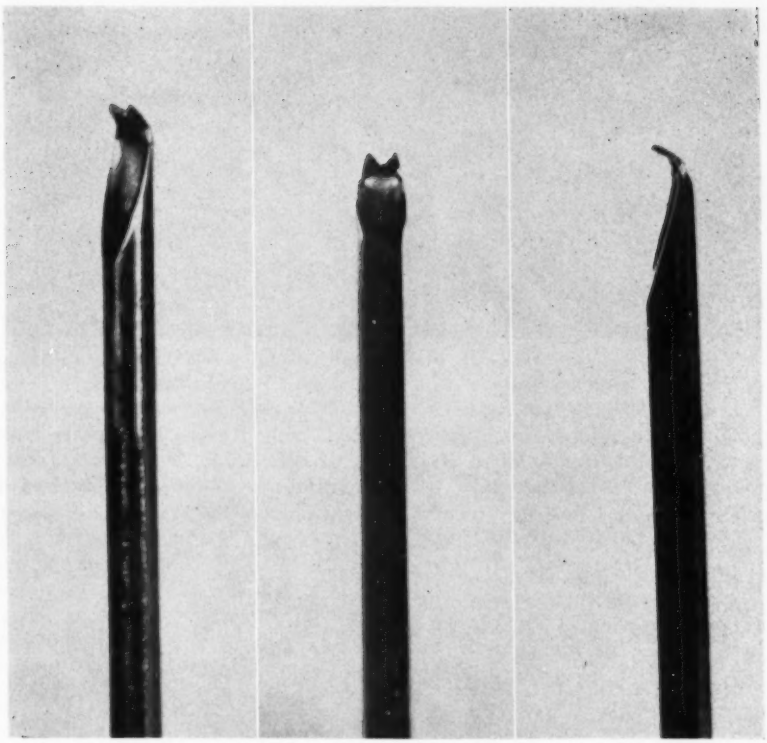

FIG. 1—Three views of the 18-gauge, 4-inch spinal puncture needle with the specially fashioned point. Weller de-epitheleizer shown was fashioned by Storz Instrument Co., St. Louis, from a Benton-Dickerson 18-gauge spinal puncture needle.

Colonel Medical Corps, Retired, U. S. Army. Recently assigned to Otolaryngology Service, Department of Surgery, Fitzsimons General Hospital, Denver. (Now with The Arnett Clinic, Lafayette, Indiana.)

Presented as a *New Instrument* at the Sixty-Fifth Annual Session of the American Academy of Ophthalmology and Otolaryngology, Oct. 9-14, 1960, Chicago.

THIS de-epitheleizer is an adjunct in the preparation for the tympanoplasty and grafting procedure. It is used to remove foreign material, keratin, blood and the epithelium from the outer surface of the tympanic membrane. The operative site is viewed with an

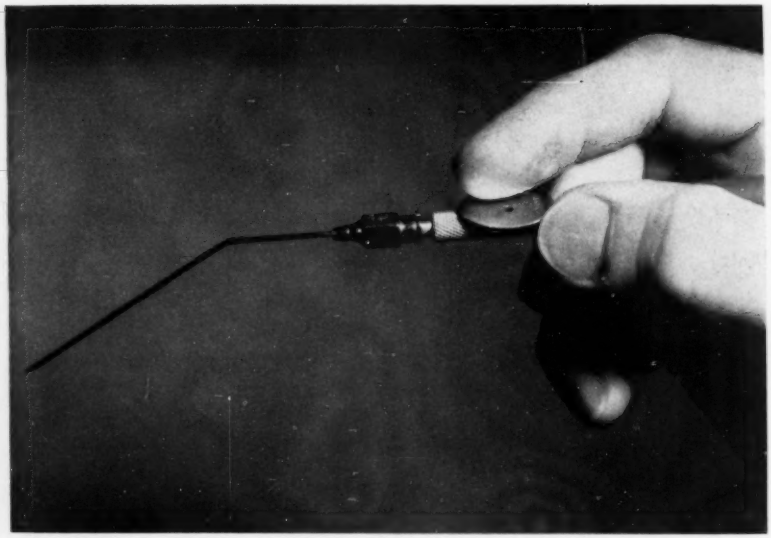

FIG. 2—Treated needle with thumb adapter attached to suction tubing.

operating microscope. Strong suction is used for aspiration. The operative field is intermittently flooded with Ringer's solution. The sharp curved claws make it possible to loosen and remove detritus and epithelium, from the tympanic membrane quickly and efficiently.

TRANSACTIONS

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SECTION ON INSTRUCTION

In the Section on Instruction in Ophthalmology on the 1961 program there were 161 Individual Courses and 70 Continuous Courses scheduled, 301 instructors, and the hours of instruction totaled 431. Of the 431 hours of instruction, six hours in the individual lectures or demonstrations and 81 hours in the Continuous Courses dealt with instrumentation. Out of the total number of hours of instruction in Ophthalmology, more than 20 per cent are on subjects that pertain to the use of instruments as diagnostic aids and appliances aside from trial cases, microscopes and surgical instruments, while less than 80 per cent of the courses have to do with pathology, physiology, pharmacology, anatomy, and the basic sciences pertaining to ophthalmology that make up the Home Study Courses.

Optical instruments required to outfit a modern office for an ophthalmologist run the gamut from electrically illuminated retinoscopes, ophthalmoscopes (at least three kinds), biomicroscope, euthyscope, lensometer, keratometer, perimeter, and focal illuminators; complicated delicate instruments for tonometry, tonography, fundus photography, specially built cameras for close-up photography, microphotography; contact lens equipment, batteries of lenses, prisms and color filters. All of this comes under the category of "scientific instruments"—precision instruments that are essential to modern practice.

The fundamental optics of some of these instruments date back more than three hundred years and the clinical application of instruments for corneal measurement has been in use for more than one hundred and fifty years. Now magnifiers with compound lenses, measuring instruments, slide rules and a catalog-full of modifications in manufacture, manipulation and cost have filled exhibit halls as well as doctors' offices. The original cost of instrumentation alone for an adequately equipped office runs into thousands of dollars. Hospital equipment, including operating microscopes, foreign body extractors, light coagulators, surgical instruments and operating equipment used only by ophthalmologists amounts to approximately

fifty thousand dollars. That's a sizable sum even for an ophthalmologist.

Instruction in the use of these diagnostic instruments of precision is not included in the Home Study Courses. There are certain skills that can be acquired only through personal instruction; they cannot be learned through books. Diseases of the eye are magnificently illustrated, but clinical differentiation is learned only at the clinic. Only by seeing patients can a doctor keep up to date. The examination of a new patient in the office of an ophthalmologist could take the full time and attention of the doctor and an assistant a full day if every piece of diagnostic equipment were to be used to its full capacity. Of course no patient needs all that. The trained assistant who first contacts the patient asks a few pointed questions. With a short history and a list of complaints the doctor can pretty well start the examination in the area of the most likely field and deviate only when he discovers conditions that require further investigation. Thus he can schedule the use of his equipment to the best advantage. However, the ophthalmologist must be prepared to use his diagnostic equipment in the proper manner and in the shortest time.

Where is he to acquire that skill? There are a few clinics where instruments are available to the student on the staff. There are short courses given to limited classes at a modest fee. There are a few kindhearted and generous ophthalmologists who will spend time with a friend in personal instruction, and then finally there is the company salesman who modestly professes to know nothing that an ophthalmologist should know, but he can tell him how to work the instrument and the doctor can take it from there. This is of great concern to the Academy, and vigorous steps are being taken to supply this marked deficiency in education and training needed to make proper use of the fine instruments in the modern office.

Over one fifth of the Academy Instruction Courses pertain to precision diagnostic equipment. Proper training in use of such instruments, especially if the result of this use is to be regarded in diagnosis and treatment, should be made a part of the curriculum in all postgraduate schools. The Academy is proud to present opportunities to its members to improve their technique and make better use of the equipment they have.

W. L. Benedict, M.D.

In Memoriam

Charles Edward Allen.....Kansas City, Missouri
April 18, 1961

Cecil Hopkins Bagley.....Baltimore, Maryland
April 15, 1961

William Alexander Boyce.....Los Angeles, California
April 24, 1961

Hal A. Childs.....Creston, Iowa
June 28, 1961

Walter Dean.....Louisville, Kentucky
March 27, 1961

Lyman Howard Heine.....Fremont, Nebraska
March 22, 1961

Stacy Claibourne Howell.....Atlanta, Georgia
March 11, 1961

Alfred Kestenbaum.....New York, New York
July 17, 1961

Roy Bartlett Metz.....Cleveland, Ohio
February 12, 1961

Frank Poydras Powers.....Raleigh, North Carolina
April 2, 1961

Edward Chiles Sweebe.....Boston, Massachusetts
May 9, 1961

Thomas Wilson Thoburn.....Shaker Heights, Ohio
February 2, 1961

William Wesley Wilkerson, Jr.....Nashville, Tennessee
March 14, 1961

THE TECHNIQUE FOR ACQUIRING AND PREPARING THE HUMAN TEMPORAL BONE FOR THE STUDY OF MIDDLE AND INNER EAR PATHOLOGY

THE study of the pathology of the middle and inner ear, and of the central nervous pathways is essential for the understanding of the disease processes which produce deafness and vestibular disorders. It is also an essential part of most experimental research in these fields.

It is of the utmost importance that temporal bones and brains be acquired in a good state of preservation from patients who had suffered from deafness and/or vestibular disorders, and for whom adequate medical histories and functional tests are available.

Permission for study of the brain and temporal bones is necessary. Ordinarily, when the brain is removed the temporal bones may be removed as well.

After the removal of the skull cap, the brain should be removed with care and the seventh and eighth cranial nerves should be cut at the orifice of the internal auditory meatus: thus, portions of the nerve trunks remain within the temporal bone specimens.

The temporal bones may be removed with the mallet and chisel, but this is not recommended because of the probability of causing fractures and damage to important parts as well as avulsion of the skin of the external auditory canal.

I. TECHNIQUES FOR REMOVING TEMPORAL BONES

The best methods for removal of the bones is by the use of a saw. Two methods are to be recommended: the Block Method and the Bone Plug Method.

A. Block Method of Removing Temporal Bones

Two types of saw may be used: a motor driven circular saw, or a rocker-type oscillating saw.

The circular saw blade should be about 1.5 inches in diameter and should be driven by a flexible shaft or mounted so as to permit getting the saw in position to make the necessary cuts. (Dr. Stacy Guild has preferred a portable "pistol-grip" electric drill, the chuck of which has been adapted to hold a short rod carrying the saw blade.)

The rocker type of oscillating saw* which is available in most autopsy rooms can be used to remove the bones by the Block Method.

Prepared by the Temporal Bone Bank Center, Box 146, Faculty Exchange, University of Chicago, Chicago 37, Illinois.

The Temporal Bone Bank Center has been established as the coordinating Center for the Temporal Banks Program for Ear Research. This program, first initiated by the Subcommittee on Research of the Committee on the Conservation of Hearing, American Academy of Ophthalmology and Otolaryngology, is indebted to the Deafness Research Foundation for substantial support, financial, educational and promotional. The Center is supported by a grant provided through the Foundation.

*The Stryker saw is available in most pathology departments, and can be obtained from the Orthopedic Frame Company, Kalamazoo, Michigan.

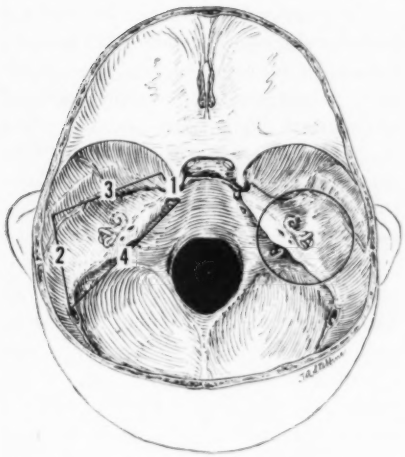

FIG. 1—On the left, the four lines labeled 1, 2, 3, and 4 indicate the position of the saw cuts for removal of the temporal bone by the Block Method.

On the right, the cylindrical block to be removed by the bone plug cutter is indicated.

Four saw cuts are made (fig. 1). Cuts 1 and 2 are made at right angles to the superior angle of the petrous pyramid. Cut 1 is made as near the apex of the petrous bone as the size and shape of the posterior cranial fossa permit; in any case, it is well anteromedial to the cochlea. The farther "forward" this cut is made, the larger is the portion of the eustachian tube obtained for study.

Cut 2 is made roughly parallel to cut 1 and through the middle mastoid region as near to its lateral wall as the saw can be held. (For most histologic studies, it is not necessary to obtain all of the mastoid processes.)

Cut 3 is made "vertically" in the floor of the middle cranial fossa about one inch in front of the petrous ridge and laterally as close to the cranial wall as the saw will go. This cut should join the forward ends of cuts 1 and 2. If properly made, this cut 3 is about three-eighths of an inch lateral and in front of the tympanic membrane, and the block of tissue removed includes the deeper part of the osseous external canal.

Cut 4 is an "undercut" of the block of tissue outlined by the preceding three cuts. It is made as nearly as possible in the anatomically horizontal plane and as near to the floor of the posterior cranial fossa as the saw can be placed; usually it is possible to make the cut pass through or below the dural exit of the vagus nerve. The posterolateral end of Cut 4 should be made first; thus, it is possible to carry the cut nearer to the apex of the petrous portion of the bone than is the case when the cut is started at the narrow anterior part of the posterior cranial fossa.

Removal of the block outlined by the four saw cuts is often the most difficult part of the entire procedure. If the cuts have not overlapped at the "deep" corners (and often they do not), the block of tissue remains held in situ not only by some bony connections but also by the dense fibrous tissue of and near the medial side of the mandibular articulation. Attempts to remove the block forcibly by the use of ordinary large forceps or by prying with a wedge usually result in crushing pneumatized areas or in making a crack along the "plane" of the middle ear. The best instrument for use in removal of the outlined block is a "lion-jawed" forceps which has been modified by making a deep "central" notch in each jaw and thinning each of the four resultant corners. The block is grasped by placing the two prongs of one jaw of the forceps in cut 4 and closing down the other jaw in such a manner that its prongs grasp the superior surface of the block just lateral to the superior angle of the petrous pyramid. This region of the superior surface is usually more free of underlying pneumatized or marrow spaces than are the more lateral portions of the superior surface. Within the block grasped as de-

scribed above, gentle back-and-forth movement of the handles of the forceps causes the unsevered bony connections at the "deep" corners to break without damage to important structures: after the bony connections are broken, while continuing to grasp the block with the forceps, it can be twisted enough to permit insertion of a knife along cuts 3 and 4 and severance of the dense fibrous connections remaining. A wider sharp chisel will often prove helpful, especially in severing the styloid process.

When properly performed, removal of the temporal bones causes no change in the outward appearance of the head.

B. *Bone Plug Method*

This method consists of using bone plug cutters in the oscillating Stryker saw. This method is rapid and simple and removes a cylindrical block of bone which includes the inner ear, middle ear, and ear drum. For the adult bone, the proper saw diameter is 1.5 inches adjusted to a depth of 1.5 inches; whereas for the child and infant, the 1.0-inch and the 0.75-inch sizes are suitable. The cutter is centered on the arcuate eminence. Water is used as a lubricant to clear the fine cutting teeth of bone dust. Better cutting action is acquired by pivoting the saw back and forth through an arc of 90 degrees. A loss of resistance is sensed when the saw has penetrated the base of the skull. The plug is grasped with a bone forceps and the inferior attachments are cut with the knife, scissors or osteotome.*

The temporal bones may be removed by the otologist, by a trainee in otolaryngology, or by a pathologist. The procedure should not increase the technical problems of the mortician, or change the external appearance of the body. Certain legal aspects, such as the necessity for acquiring special permission to remove the temporal bones, vary in different localities and with different interpretations of the law. *Note:* When removing bones for study of the histopathology, the Block Method has two advantages: it permits removal of the eustachian tube area if desired, and the needed equipment is available in most autopsy rooms.

The bone plug cutter used with the Stryker saw is also suitable for removal of bones for either histopathologic studies or anatomical surgical dissection and is a rapid and simple method. It must be used with care, however, to avoid breaking the saw blade. Also, the bone plug cutter may not be found as standard equipment in autopsy rooms.

II. PREPARATION FOR PROCESSING OF THE SPECIMENS

1. *Method of Fixation of Bones and Brain*

Immediately after the bones and brain have been removed, they should be placed into 400 cc. of 20 per cent formalin (one part commercial formalin to four parts water). In diluting the formalin, it is preferable to use distilled water which has been degassed in vacuum because it will absorb air bubbles trapped in the middle ear and mastoid and will facilitate penetration of a fixing solution. The specimens are placed in fresh 10 per cent formalin solution each day for two days. The specimens can be kept indefinitely in formalin.

*Two motion pictures showing the techniques for removal of the temporal bones are available. One is a ten-minute 16-mm. silent film by Dr. Edmund Fowler, Jr., showing the Block Method of removal, and the other is a twenty-minute 16-mm. film with sound by Dr. Harold F. Schuknecht, showing the Bone Plug cutter technique. These films may be acquired from the Executive Secretary of the American Academy of Ophthalmology and Otolaryngology or by writing to the Temporal Bone Bank Center at the University of Chicago.

When the histopathologic changes in the inner ear are likely to be of primary importance and permission for autopsy has been granted, more rapid fixation may be obtained by injection of the formalin solution through the ear drum to fill the middle ear promptly after death.

2. *Shipping*

After the bones have remained in 10 per cent formalin solution for three days or more, they may be shipped. They should be wrapped separately in gauze, and packed and sealed either in a plastic bag or glass jar immersed in the formalin solution. The brain should be packed in a similar way. The sealed receptacles are then suitably packed in a carton or other container and shipped to the laboratory for processing.

3. *Processing*

A list of the laboratories which are cooperating with the Temporal Bone Bank Program and are prepared to process the pathologic specimens is kept at the Temporal Bone Bank Center.

In certain instances the specimens may be sent to a particular laboratory; for example, at the request of the otologist or physician who has acquired the bones, or because of some special connection with the case, or because of proximity of the laboratory. Otherwise, the specimens will be distributed in rotation to the cooperating laboratories.

The address of the laboratory* to which the specimens are to be shipped will be furnished by the Temporal Bone Bank Center.

*A list of the otologic laboratories cooperating with the Temporal Bone Bank Program is maintained at the Temporal Bone Bank Center for Ear Research, Box 186, Faculty Exchange, University of Chicago, Chicago 37, Illinois.

4. *Distribution of the Processed Material*

The Subcommittee on Research has suggested that the cooperating laboratories prepare three representative tracer sets of slides from each specimen: one set for the otologist who has provided the specimen, a second set to be retained in the laboratory, and a third set reserved for a central collecting laboratory or repository where such specimens will be available for general study. The remaining unmounted sections should be retained by the cooperating laboratory to be available as needed for special stains.

5. *Information to Accompany Specimens*

In cases in which the temporal bones and brain have already been pledged to the Temporal Bone Bank for Ear Research, the history and functional examination findings will be on file at the Temporal Bone Bank Center. Additional information should be furnished with the specimens, including identification, recent otologic functional tests, diagnosis of terminal illness, time of death, time of placing the specimens in fixative, and the autopsy report.

If there is no file at the Center on the case, it is necessary that full information be furnished to the Temporal Bone Bank Center, including the medical and otologic history of the case and former otologic functional tests.

When appropriate, the director of the processing laboratory may make an original report on the histopathologic findings, giving due credit to the Temporal Bone Bank Program or to the submitting otologist or physician, as the case may be. The accumulated specimens at the central repository will then be available for correlative studies by interested persons and for instruction purposes.

III. PREPARATION OF TEMPORAL BONES FOR ANATOMICAL-SURGICAL DISSECTION

Those specimens which are to be used for future anatomical-surgical dissection may be preserved by refrigeration. They can be placed in a jar containing cotton soaked in 1:1000 aqueous metaphen and stored in the cooling compartment of the refrigerator. The fresh state may be preserved for many months by placing the specimens in moist cotton, wrapping them in freezer paper and placing them in the freezing compartment.

A temporal bone specimen may be prepared for anatomical-surgical dissection by embedding it in plaster of Paris in a suitable container. A Frenckner temporal bone holder,* which consists of a heavy hemispherical bowl held in a stand which permits it to be tilted, is recommended. In order to make the most use of the anatomic material, the trainee must first acquire a detailed knowledge of the anatomy of the temporal bone. He should also have available a full set of surgical instruments, including headlight, loupe, irrigation equipment, suction apparatus, bone drill and operating microscope.

*The Frenckner temporal bone holder is available from Douglas Tool Company, 2300 East Nine Mile Road, Hazel Park, Michigan.

MINUTES OF THE ANNUAL MEETING OF THE INTERNATIONAL ASSOCIATION OF SECRETARIES OF OPHTHALMOLOGICAL AND OTOLARYNGOLOGICAL SOCIETIES OCTOBER 11, 1960

COUNCIL MEETING

The Council of the International Association of Secretaries of Ophthalmological and Otolaryngological Societies held a luncheon meeting on October 10, 1960, the day before the annual business meeting. Those present were President Mike Barone, President-elect Peter Pastore, Editor Paul C. Craig, Executive Board Members Roland Myers, Daniel DeStio and Archie Cruthirds, Secretary David Stratton, and directors and committee members Harry Glick, Rod Macdonald, Sr., and Rod Macdonald, Jr., Edley Jones, J. A. Dillahunt, and Dr. Edwin Askren representing Jack Stokes.

The action of the council was presented to the Association at the annual meeting on October 11 and is included in the minutes below.

ANNUAL MEETING

The annual meeting of the Association was held in Private Dining Room 14, Palmer House, at 5:30 p.m., October 11, 1960. The Association members were guests of the Academy at the dinner meeting, thirty-five persons being present. At the conclusion of the meal all present introduced themselves and the registration book was passed around and signed by each.

Dr. Barone welcomed all those present.

Dr. Barone then introduced Dr. Chevalier Jackson, who spoke enthusiastically of the Eighth Pan American Otolaryngological Congress meeting.

Dr. Charles Jaeckle, Secretary of the National Foundation for Eye Care, was then introduced. He explained the purpose of the Foundation and asked for the help and cooperation of all secretaries in furthering the aims of the organization.

President Barone then introduced a symposium on "The Duties and Privileges of the Secretary: The Program and Social Arrangements of an Eye, Ear, and Throat Organization."

The first speaker, Dr. Earl G. Padfield, Kansas City, Missouri, Secretary of the Kansas City Society of Ophthalmology and Otolaryngology, spoke on the Local Eye, Ear, Nose and Throat Society. The second speaker, Dr. Samuel M. Diskan, Atlantic City, New Jersey, President of the New Jersey Ophthalmological Society, spoke on the State Organization. The third speaker, Dr. Homer E. Smith, Salt Lake City, Utah, Secretary of the Pacific Coast Ophthalmological Society, spoke on the Regional Organization. The three speakers gave short, succinct talks concerning different phases of the eye, ear, nose and throat society, and there was a short question and answer period which followed.

President Barone then accepted a reply from Dr. Sam Sanders, who had been granted honorary membership in the organization.

Dr. Edley Jones gave a report on the Liaison Committee to the Academy and reported extensively on the American Otolaryngological Society-Plastic Surgery matter. The Secretary then reviewed correspondence calling the Association's full attention to recent articles in lay magazines on plastic surgery and particularly to the article printed in the July 1960 issue of *Harper's Bazaar*. After full discussion, a motion was unanimously passed condemning such articles as undesirable and unethical, and the Secretary was directed to so inform the Advisory Board of Medical Specialties and request the Board to exert every effort to control this situation and prevent recurrences.

Dr. Cruthirds reported on plans for the XIX International Congress of Ophthalmology and read a telegram of greeting from Dr. Tamesis of the Asian Pacific Ophthalmological and Otolaryngological Society, which was in session.

Dr. DeStio, Chairman of the Nominating Committee, read the Nominating Committee report which named Peter Pastore for President, Harry Glick for President-elect and Earl Padfield, Sam Johnson, and H. B. Lockhart, new directors for a period of three years, and Editor Paul Craig and Secretary Dave Stratton, each to succeed himself. There being no further nominations, the nominations were closed and the above slate of officers elected unanimously.

President Barone then gave a brief summation of his impression of his year in office and thanked everyone for their help. He then recognized the new President, Peter Pastore. Dr. Pastore thanked Dr. Barone for his efforts over the past year and urged that the gathering give Dr. Barone a round of applause. Dr. Pastore then voiced the belief that we would have a good year and asked each one for his help.

There being no further business, the meeting adjourned.

Respectfully submitted,

J. D. Stratton, M.D.

Secretary

IN MEMORIAM

September 1, 1960 to September 1, 1961

James Paulette Aderhold, San Antonio, Texas

Charles Edward Allen, Kansas City, Missouri

Ruskin Gregory Anderson, Spartanburg, South Carolina

Ralph Aranovitz Arnold, Durham, North Carolina

Cecil Hopkins Bagley, Baltimore, Maryland

Saul Edward Barnett, Detroit, Michigan

David Isaac Bassett, New York, New York

Ione Fisher Beem, Van Nuys, California

Macks Leonard Bergman, Los Angeles, California

Henry Ernest Binger, Phoenix, Arizona

Henry H. Black, Pittsburgh, Pennsylvania

Nelson Miles Black, Miami, Florida

William Feuilleteau Bonner, New Orleans, Louisiana

William Alexander Boyce, Los Angeles, California

John C. Brown, Los Gatos, California

Richard Omri Bullis, Jr., Los Gatos, California

Stanley Sherman Burns, St. Louis, Missouri

Truman Young Burton, Colorado Springs, Colorado

C. Coulter Charlton, Absecon, New Jersey

Julius James Chevigny, Gary, Indiana

Hal A. Childs, Creston, Iowa

John Sheldon Clark, Freeport, Illinois

Kosciusko Walker Constantine, Palm Beach, Florida

Anthony John Conty, Union City, New Jersey

William Albert Cook, Tulsa, Oklahoma

John James Crume, Amarillo, Texas

Arthur Merl Culler, Columbus, Ohio

Merle Jasper Davis, Terre Haute, Indiana

Walter Dean, Louisville, Kentucky

Philip Harold Decker, Williamsport, Pennsylvania

Charles Wentworth DeWolf, Melrose, Massachusetts

Arthur Ernest Doull, Halifax, N. S., Canada

Ralph Graves Ferris, Birmingham, Michigan

Philip Harold Fink, Kew Gardens, New York

Louis Zolo Fishman, Walnut Creek, California

Frank Carmine Furlong, Schenectady, New York

Samuel Theodore Glasford, Pekin, Illinois

Joseph Isadore Gouterman, Philadelphia, Pennsylvania

Henrik Sofas Graeser, Woodland, California

Frederick Evans Grant, Kalamazoo, Michigan

Hendrie Walter Grant, St. Paul, Minnesota

Rex E. Greer, Amarillo, Texas

Edward William Harris, Columbus, Ohio

Lyman Howard Heine, Fremont, Nebraska

William Hewson, Philadelphia, Pennsylvania

Ernest Cain Hillyer, Los Angeles, California

William Peter Hofmann, Davenport, Iowa

Delos Wylie Hogue, Rye, New York

Stacy Claibourne Howell, Atlanta, Georgia

Hollis Carlyle Ingram, Orlando, Florida

Chevalier Lawrence Jackson, Philadelphia, Pennsylvania

George Francis Joseph Kelly, Merion, Pennsylvania

John Arthur Kerst, Springfield, Illinois

Alfred Kestenbaum, New York, New York

Perley Howe Kilbourne, Dayton, Ohio

Edgar William Killian, Streator, Illinois

Maurice C. Landau, Glens Falls, New York

Bernard John Larkin, Indianapolis, Indiana

Granville Allen Lawrence, Towson, Maryland

David Taylor Loy, Great Bend, Kansas

Percy Blakely Macfarlane, Hamilton, Ont., Canada

Jacob John Mann, Perth Amboy, New Jersey

Roy Earl Mason, St. Louis, Missouri

Gervais Ward McAuliffe, Bridgehampton, New York

George Martin McBean, Chicago, Illinois

Carl Heber McCaskey, Indianapolis, Indiana

Joseph Francis McGowan, Asheville, North Carolina

Roy Bartlett Metz, Cleveland, Ohio

George Henry Moore, Upper Darby, Pennsylvania

Robert Lowry Moorhead, Brooklyn, New York

Ben Franklin Mowry, Findlay, Ohio

Carroll Richard Mullen, Philadelphia, Pennsylvania

Thomas Viggers Murto, Trenton, New Jersey

Elmer William O'Brien, Webster, New York

Gerald Richard O'Brien, Brooklyn, New York

John Joseph Pagliughi, Union City, New Jersey

Carlos Eugene Pitkin, Cleveland, Ohio

Gerald Ogden Poole, Wilmington, Delaware

Frank Poydras Powers, Raleigh, North Carolina

Aaron Roth, Brooklyn, New York

Edmund Winchester Rucker, Jr., Birmingham, Alabama

Dewey St. John, St. Louis, Missouri

John Frederick Sarno, Johnstown, New York

Harry Theodore Schiefelbein, Welch, West Virginia

Henry Edward Schlegel, Jr., Oregon City, Oregon

Harry Raymond Secoy, Everett, Washington

Maurice Arthur Sher, Brooklyn, New York

James Jacob Simkins, Philadelphia, Pennsylvania

Walter Knapp Slack, Saginaw, Michigan

William Jewell Smith, Fresno, California

Lansford Monroe Spalding, Astoria, Oregon

Edward Stein, Oak Park, Michigan

Leigh F. Sturges, Manhasset, New York

Edward Chiles Sweebe, Boston, Massachusetts

Thomas Wilson Thoburn, Shaker Heights, Ohio

Edward Henry Thompson, Cincinnati, Ohio

John Malcolm Tindal, Chicago, Illinois

Frederick Myles Turnbull, Los Angeles, California

Paul Robert Urmston, Bay City, Michigan

Clarence Archibald Veasey, Jr., Spokane, Washington

Henry Patrick Wagener, Rochester, Minnesota

Robert Francis Welch, Brockton, Massachusetts

William Wesley Wilkerson, Jr., Nashville, Tennessee

Samuel Henry Wilkins, Boston, Massachusetts

Henry G. Wincor, New York, New York

David Ray Womack, Austin, Texas

JAMES PAULETTE ADERHOLD

James Paulette Aderhold was born on May 8, 1905, in Del Rio, Texas. He attended Tulane University School of Medicine, receiving the degree of Doctor of Medicine in 1928. Dr. Aderhold served an internship at Santa Rosa Hospital in San Antonio from 1928 to 1929. From 1929 to 1930 he was a resident in otolaryngology at Strong Memorial Hospital, a University of Rochester hospital. He served as an assistant surgeon from 1929 to 1931 and completed a residency in ophthalmology from 1930 to 1931 at the University hospitals in Rochester, New York. Dr. Aderhold was certificated by the American Board of Otolaryngology in 1947.

Dr. Aderhold began the practice of medicine in 1932 in San Antonio, Texas. He was on the staffs of Santa Rosa Hospital, Nix Memorial Hospital, and Baptist Memorial Hospital. Dr. Aderhold was also civilian consultant in otolaryngology at Brooke Army Hospital and associate professor of otolaryngology at Baylor University College of Medicine, Postgraduate School.

Dr. Aderhold was a Fellow of the American Academy of Ophthalmology and Otolaryngology and held membership in the San Antonio Society of Ophthalmology and Otolaryngology, the Texas Society of Ophthalmology and Otolaryngology, the Southern Medical Association, the American Medical Association, and state and local medical societies.

Dr. Aderhold died on January 21, 1961, in San Antonio, Texas. He is survived by his wife, Louise Haskins Aderhold, a son, James Edward, and a daughter, Laura Louise.

CHARLES EDWARD ALLEN

Dr. Charles Edward Allen, a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, died at his home in Kansas City, Missouri, on April 18, 1961, at the age of 84 years.

Charles Edward Allen was born in Rich Hill, Missouri, on October 22, 1877. In 1904 he received his degree of Doctor of Medicine from the Kansas City Hahnemann Medical College (later known as Southwest School of Medicine and Hospital). He engaged in postgraduate study at New York Ophthalmic Hospital, which granted him the title of Oculi et Auris Chirurgis in 1910. He was among the first group to be certificated by the American Board of Otolaryngology.

Dr. Allen practiced his specialty in Kansas City, Missouri, throughout his profes-

sional life. He was associated there with St. Joseph Hospital.

The death of Dr. Allen marked the passing of the last living founder of the Sertoma Club, a civic organization dedicated to the service of mankind with more than two hundred and fifty local clubs throughout the United States, Canada, and Mexico.

Dr. Allen is survived by his wife, Laura M. Allen, and a daughter, Mrs. George Richardson.

RUSKIN GREGORY ANDERSON

Ruskin Gregory Anderson was born on May 17, 1907, in Woodruff, South Carolina. He attended Furman University in Greenville, South Carolina, and Emory University School of Medicine, Atlanta, Georgia, receiving his degree of Doctor of Medicine in 1931. Dr. Anderson served a rotating internship at Emory University from 1931 to 1932, and a residency in ophthalmology and otolaryngology at Grady Hospital in Atlanta from 1932 to 1934. In 1935 and 1936 he was a resident ophthalmologist at the St. Louis City Hospital in St. Louis, Missouri. He was certificated by the American Board of Ophthalmology in 1936 and by the American Board of Otolaryngology in 1944.

Dr. Anderson began the pratice of medicine in Spartanburg, South Carolina, in 1936. He was chief of staff of the eye, ear, nose and throat service at Spartanburg General Hospital. From 1942 to 1946 he served in the medical corps of the Army of the United States, holding the rank of lieutenant colonel, and receiving the Army Commendation Ribbon. In 1946 he resumed his civilian post as chief of ophthalmology and otolaryngology at Spartanburg General Hospital.

Dr. Anderson was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and held membership in the American Medical Association and the Southern Medical Association. He was a past president of the North and South Carolina Medical Society and of the Spartanburg County Medical Society.

Dr. Anderson died on December 30, 1960, in Spartanburg. He is survived by his wife, two sons and two daughters.

RALPH ARANOVITZ ARNOLD

Ralph Aranovitz Arnold was born on December 4, 1910, in Rochester, New York. He attended the University of Rochester, receiving a Bachelor of Arts Degree in 1932, and the University of Buffalo School of Medicine, earning his degree as Doctor of Medicine in 1936.

Dr. Arnold served an internship and a residency in ophthalmology and otolaryngology at Duke Hospital on the campus of Duke University in Durham, North Carolina, from 1936 to 1938. He served as house officer in ophthalmology and otolaryngology at Duke Hospital from 1937 to 1940. In 1941 Dr. Arnold did postgraduate study in otolaryngology at Harvard University School of Medicine. He was certificated by the American Board of Otolaryngology in 1941 and by the American Board of Ophthalmology in 1943.

Dr. Arnold began the practice of his specialty in Durham, North Carolina, in 1941. He was associated with Duke Hospital, was associate professor of Otolaryngology and Ophthalmology at Duke University School of Medicine, and served as a consultant at the Veterans Administration Hospital in Durham.

Dr. Arnold was a Fellow of the American Academy of Ophthalmology and Otolaryngology. He was a member and past president of the North Carolina Eye, Ear, Nose and Throat Society, and held membership in the American Laryngological, Rhinological, and Otological Society, the Otosclerosis Study Group, the American Medical Association, the Southern Medical Association, and state and local medical societies.

Dr. Arnold died on July 17, 1960, in New York City. He is survived by his wife, one daughter and three sons, all of Durham.

CECIL HOPKINS BAGLEY

Cecil Hopkins Bagley was born in Bagley, Maryland, on August 17, 1893. After receiving the degree of Bachelor of Arts from Johns Hopkins University, he attended the Medical School of his alma mater, which granted him the degree of Doctor of Medicine in 1921. Dr. Bagley

completed a residency in surgery at Johns Hopkins University Medical School in 1924, and a residency in ophthalmology at the newly organized Wilmer Institute of Johns Hopkins in 1927. Before entering the private practice of ophthalmology in Baltimore, he spent a year as assistant to Dr. William H. Wilmer, founder of the Institute. He was certificated by the American Board of Ophthalmology in 1932.

Dr. Bagley continued his association with his alma mater as instructor in ophthalmology at Wilmer Institute until his retirement in 1958, and as a visiting ophthalmologist at Johns Hopkins Hospital. In his private practice he was associated with Union Memorial Hospital, Hospital for Women of Maryland, Church Home and Hospital, and General Hospital of Hanover, Pennsylvania.

Dr. Bagley was a Fellow of the American Academy of Ophthalmology and Otolaryngology and a member of the American Medical Association, the Southern Medical Association, and state and local medical societies.

Dr. Bagley died in Baltimore on April 15, 1961, aged 67 years.

SAUL EDWARD BARNETT

Saul Edward Barnett was born on April 15, 1893. He attended Wayne State University, receiving his degree of Doctor of Medicine in 1916. Dr. Barnett interned at Harper Hospital in Detroit from 1916 to 1918.

Dr. Barnett began the practice of medicine in 1918 in Detroit. Throughout his career he continued his medical studies. In 1921 he did postgraduate study in Chicago, and in 1928 he studied in Vienna. In 1945 he took a postdoctoral course in Clinical Research Allergy. Dr. Barnett was certificated by the American Board of Otolaryngology in 1928.

Dr. Barnett was chief of the Barnett Hospital and Clinic, and attending ophthalmologist and otolaryngologist at the Jewish Home for the Aged and the Woman's Hospital.

Dr. Barnett was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology and a fellow of the American College of Surgeons. He held membership in the American Medical Association and state and local medical societies.

Dr. Barnett died on December 3, 1960, in Detroit, Michigan. He is survived by a daughter and two brothers.

DAVID ISAAC BASSETT

David Isaac Bassett was born on August 28, 1898, in Russia. He received his degree of Doctor of Medicine in 1925 from the Universita Karlova Fakulta Lekarska in Prague, Czechoslovakia, and served his internship and residency at the same institution. He was certificated by the American Board of Otolaryngology in 1939.

Dr. Bassett began the practice of medicine in New York City in 1929. He was attending otolaryngologist at the Bronx Hospital and associate attending otolaryngologist at Morrisania City Hospital. In addition to his hospital posts, he served as clinical associate in otolaryngology at the New York Medical College.

Dr. Bassett was a Fellow of the American Academy of Ophthalmology and Otolaryngology and of the New York Academy of Medicine. He held membership in the American Otorhinologic Society for Plastic Surgery, the Bronx Otolaryngological Society and the American Medical Association. He also belonged to state and local medical societies.

Dr. Bassett died on September 24, 1960, in Yonkers, New York. He is survived by his wife and two sons.

IONE FISHER BEEM

Dr. Ione Fisher Beem, a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, died in Pasadena, California, on August 6, 1960, aged 84 years.

Ione Fisher Beem received the degree of Doctor of Medicine from the University of Illinois College of Medicine, Chicago, in 1913. She established a practice in oph-

thalmology and otolaryngology in Chicago, which she maintained for many years. In 1950 she retired from practice and moved to California.

MACKS LEONARD BERGMAN

Macks Leonard Bergman was born on April 28, 1908, in Burlington, Vermont. He attended the University of Vermont, receiving the degree of Bachelor of Science in 1933 from the College of Arts and Sciences, and the degree of Doctor of Medicine in 1936 from the College of Medicine. Dr. Bergman interned in Pittsfield, Massachusetts, at the House of Mercy Hospital from 1936 to 1937. He was assistant physician to the Commonwealth of Massachusetts from 1937 to 1940. From 1940 to 1942 he served as a physician with a Veterans Administration Hospital. Dr. Bergman served a residency in ophthalmology and otolaryngology at the Wayne County General Hospital in Eloise, Michigan, from 1942 to 1943, and from 1943 to 1944 was chief resident physician there. He was certificated by both the American Board of Ophthalmology and the American Board of Otolaryngology in 1950.

Dr. Bergman was associated with the Kuhn Clinic in Hammond, Indiana, during 1944 and 1945. He moved to California in 1945, where he was associated with the Permanente Foundation Hospital in Oakland. From 1946 to 1947 he served as otorhinolaryngologist at the Ross-Loos Medical Group in Los Angeles. In 1947 he established a private practice in ophthalmology and otorhinolaryngology in Inglewood, California. He was on the staff of the Los Angeles Eye and Ear Hospital and associated with Hawthorne Hospital in Hawthorne, California.

Dr. Bergman was a Fellow of the American Academy of Ophthalmology and Otolaryngology and held membership in the Pacific Coast Oto-Ophthalmological Society, the Pan-American Association of Ophthalmology, the Los Angeles Society of Ophthalmology and Otolaryngology, and the American Medical Association, as well as state and local medical organizations.

Dr. Bergman died on December 18, 1960, in Inglewood, California. He is survived by his wife, Sophia Barron Bergman, and two children, Sandra H. Bergman and Ronald S. Bergman.

HENRY ERNEST BINGER

Henry Ernest Binger was born in Tulare, South Dakota, on December 11, 1885. He received his degree as Doctor of Medicine from University of Minnesota College of Medicine and Surgery in 1910, and completed a 2-year residency in eye, ear, nose and throat at the Mayo Clinic, Rochester, Minnesota. He served as a Teaching Fellow at the University of Minnesota Medical School from 1914 through 1917. Dr. Binger was certificated by the American Board of Ophthalmology in 1923.

For many years Dr. Binger practiced his specialty in St. Paul, Minnesota. In 1951 he moved to Phoenix, Arizona, where he died on March 13, 1961.

Dr. Binger was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and a fellow of the American College of Surgeons. He was a member of the Minnesota Academy of Ophthalmology and Otolaryngology, and its president in 1939.

HENRY H. BLACK

Dr. Henry H. Black, who was born in Pittsburgh, Pennsylvania, on March 10, 1899, died in the city of his birth on May 13, 1961.

Henry H. Black had received his degree as Doctor of Medicine from St. Louis University School of Medicine, St. Louis, Missouri, in 1930. He had done postgraduate work in ophthalmology, and had received certification from the American Board of Ophthalmology in 1957.

Dr. Black was assistant in Ophthalmology at Montefiore Hospital and at Passavant Hospital in Pittsburgh.

Dr. Black was a Fellow of the American Academy of Ophthalmology and Otolaryngology. He also held membership in the Pennsylvania Academy of Ophthalmology and Otolaryngology, the Pittsburgh Ophthalmological Society, the American Medi-

cal Association, and state and local medical societies.

Dr. Black is survived by his wife.

NELSON MILES BLACK

Nelson Miles Black was born on January 21, 1870, in Mount Vernon, Illinois. He attended Northwestern University, receiving the degree of Graduate of Pharmacy in 1890, and the University of Pennsylvania School of Medicine, receiving the degree of Doctor of Medicine in 1894. Dr. Black served his internship at St. Barnabas Hospital and at Wills Eye Hospital from 1894 to 1896.

Dr. Black began the practice of medicine in 1897 in Milwaukee, Wisconsin. For a brief time he was professor of eye, ear, nose and throat at Milwaukee Medical School. In 1898 he served as a captain in the Medical Corps of the United States Army in the Spanish-American War, and was stationed in the Philippine Islands. Returning to civilian life in 1900, Dr. Black continued his practice in Milwaukee until 1901. He then traveled in England, France, Austria and Switzerland to continue his studies in ophthalmology. From 1901 to 1909 Dr. Black was ophthalmologist at the National Soldier's Home, and from 1905 to 1912 he served on the staff of Milwaukee County Hospital. From 1907 to 1920 he was on the staff of Milwaukee Children's Hospital.

Dr. Black served in World War I from 1917 to 1920. His rank was that of Major and later, in 1918, Lieutenant Colonel. In 1919 he was assigned with the American Expeditionary Forces in France to a hospital there as senior consultant in ophthalmology and otolaryngology. He was chief of the section and head of the division of surgery of the Surgeon General's office.

In 1920 Dr. Black established a practice of ophthalmology in Miami, Florida. He was on the staff of St. Francis Hospital, Miami Beach, and Jackson Memorial Hospital and Victoria Hospital in Miami. He retired from active practice in 1952.

Dr. Black was certificated by the American Board of Ophthalmology in 1917, the first year of its organization.

In 1933, Dr. Black served as First Vice-President of the American Academy of Ophthalmology and Otolaryngology, of which he had become a member in 1903. He had been Guest of Honor at the Annual Meeting of the Academy in 1944, and the Council voted to bestow upon him the rank of Honorary Fellow.

Dr. Black was also a fellow of the American College of Surgeons. He was a member of the Association for Research in Ophthalmology, the American Ophthalmological Society, the American Medical Association, and state and local medical societies. In 1920-21 he served as Chairman of the Section on Ophthalmology of the American Medical Association.

Dr. Black died on June 13, 1961, in Miami, Florida. He is survived by his wife, Zella McDonald Black.

WILLIAM FEUILLETEAU BONNER

William Feuilleteau Bonner was born on December 25, 1884, in Bastrop, Louisiana. He attended the University of Texas in Austin, and the University of Pennsylvania School of Medicine, receiving his degree of Doctor of Medicine in 1910. Dr. Bonner did postgraduate work at the University of Vienna under Professor Hans Lauber. He was certificated by the American Board of Ophthalmology in 1925, and by the American Board of Otolaryngology in 1927.

Dr. Bonner began the practice of medicine in 1915 in San Antonio, Texas. In 1917 he joined the Army Air Force, serving in the Medical Corps. He also served during the Second World War.

Since 1937, Dr. Bonner had been with the Veterans Administration, serving at various hospitals, including those at Milwaukee, Wisconsin; Batavia, New York; Wilmington, Delaware; Sweetwater, Texas; Temple, Texas, and Childress, Texas. In 1953 he was assigned to the Outpatient Clinic of the Veterans Administration Regional Office in New Orleans, where he remained until his death.

Dr. Bonner was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology. He held membership in the Aero Medical Association and the American Medical Association.

Dr. Bonner died on December 27, 1960, in New Orleans. He is survived by his wife, Harriette Burt Bonner, a son and a daughter.

WILLIAM ALEXANDER BOYCE

William Alexander Boyce was born in Boyce, Texas, March 22, 1881. He received the degree of Doctor of Medicine from the Medical Department of Tulane University of Louisiana in 1905.

Dr. Boyce had formerly practiced medicine in Dallas, Texas, where he was the first assistant medical director of Southland Life Insurance Company and served on the staff of St. Paul's Hospital. After 1919 he limited his practice to ophthalmology, and he was certificated by the American Board of Ophthalmology in 1929. Dr. Boyce moved to Los Angeles, California, where he served as professor of ophthalmology at the College of Medical Evangelists and was on the staffs of Los Angeles County and California hospitals. He retired from practice in 1952.

Dr. Boyce was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and of the American College of Surgeons, and he held membership in the American Medical Association and state and local medical societies.

Dr. Boyce died in Los Angeles on April 24, 1961, at the age of 80 years. He is survived by his wife, Estelle.

JOHN C. BROWN

John C. Brown was born on August 30, 1876, in Carthage, Missouri. He attended Stanford University, receiving a Bachelor of Science degree in Zoology in 1899, and the University of Minnesota School of Medicine (Minnesota College of Medicine and Surgery), receiving his degree of Doctor of Medicine in 1907. Dr. Brown did postgraduate work at the University of Minnesota and Harvard University.

Dr. Brown began the practice of medicine in 1907 in St. Paul, Minnesota. For forty-one years he was an associate professor of comparative anatomy at the University of Minnesota in the Graduate Medical School. He was associated with Ancker Hospital and St. Luke's Hospital in St. Paul.

Dr. Brown was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology.

Zoology was a subject of fascination to Dr. Brown. He had a collection of over 1,200 skulls of mammals and reptiles which he had accumulated over a period of seventy-six years. Of especial interest to him were the Batrachia. The collection was willed to Stanford University.

Dr. Brown died on November 27, 1960, in Los Gatos, California. He is survived by his wife, Rena Brainerd Brown, and two sons, John A. Brown of St. Paul, Minnesota, and Dr. Gordon A. Brown of Monte Sereno, California.

RICHARD OMRI BULLIS, JR.

Richard Omri Bullis, Jr., was born in Los Angeles, California, on November 26, 1923. He attended Stanford University, and received the degree of Doctor of Medicine from Stanford University School of Medicine in 1948.

After completing his internship, Dr. Bullis entered a residency in ophthalmology at Los Angeles County General Hospital. His residency was interrupted by service in the Medical Corps of the United States Army from 1950 through 1953. During the latter half of his service, he engaged in eye research at Letterman Army Hospital, San Francisco.

Dr. Bullis completed his residency at Los Angeles County General Hospital in 1955, and was certificated by the American Board of Ophthalmology in 1959. He established a practice in his specialty in Los Gatos, California, and was a member of the associate staff of O'Connor Hospital, San Jose, and of the courtesy staff of San Jose Doctor's Hospital.

Dr. Bullis was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and a member of the American Medical Association and state and local medical societies.

Dr. Bullis died on January 9, 1961, aged 37 years.

STANLEY SHERMAN BURNS

Stanley Sherman Burns was born in Belleville, Illinois, in 1889. He received the degree of Doctor of Medicine from Washington University School of Medicine in 1910 and interned at St. Louis City Hospital for two years, specializing in otolaryngology.

Dr. Burns established a practice in otolaryngology in St. Louis. In 1925 he was certificated by the American Board of Otolaryngology in one of the first groups to be recognized by that Board. For many years he was associated with Lutheran Hospital, St. Luke's Hospital, Jewish Hospital, and Deaconess Hospital in St. Louis.

Dr. Burns became a Fellow of the American Academy of Ophthalmology and Otolaryngology in 1919, and was granted the status of Life Fellow in 1949. He also held membership in the American Medical Association and in state and local medical societies.

Dr. Burns died in St. Louis on August 22, 1960.

TRUMAN YOUNG BURTON

Truman Young Burton was born in 1926 in Salt Lake City, Utah. He attended the University of Utah, receiving his degree of Doctor of Medicine in 1952. Dr. Burton continued his studies at the Mayo Clinic in Rochester, Minnesota, where he was a fellow in ophthalmology in the Mayo Foundation. From 1952 to 1954 his medical studies were interrupted when he served in the United States Naval Reserve, Medical Corps. He returned to the Mayo Clinic in 1956 to complete his studies. Dr. Burton was certificated by the American Board of Ophthalmology in 1958.

Dr. Burton began the practice of his specialty in 1957 in Colorado Springs, Colorado, where he became affiliated with the Colorado Springs Eye Clinic and served on the staffs of Glockner-Penrose Hospital, St. Francis Hospital, and Memorial Hospital.

Dr. Burton was a Fellow of the American Academy of Ophthalmology and Otolaryngology and held membership in the American Medical Association and state and local medical and specialty societies.

Dr. Burton died on December 29, 1960, in Colorado Springs. He is survived by his wife and two children.

C. COULTER CHARLTON

Dr. C. Coulter Charlton, a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, died on January 9, 1961, in Absecon, New Jersey. Dr. Charlton had been a member of the Academy since 1916.

C. Coulter Charlton was born in 1887. He received the degree of Doctor of Medicine from the Louisville University School of Medicine in 1908 and began his medical career as a general practitioner. In 1917 he was commissioned in the Medical Corps of the United States Army and served through World War I and World War II. When he had completed his military tour of duty in World War I, he did postgraduate work in otolaryngology and then established a practice in that specialty in Atlantic City, New Jersey. He was associated with the Atlantic City Hospital, where he was chief of the ear, nose and throat section.

Dr. Charlton was a fellow of the American College of Surgeons and a member of the American Laryngological Society.

JULIUS JAMES CHEVIGNY

Julius James Chevigny was born in Hammond, Indiana, on April 1, 1903. He attended the University of Notre Dame and Northwestern University Medical School, receiving his degree in medicine in 1927. Dr. Chevigny was certificated by the American Board of Otolaryngology in 1943.

Dr. Chevigny began the practice of medicine in Gary, Indiana, in 1932. He was on the senior staff at Mercy Hospital and on the staff of Methodist Hospital.

Dr. Chevigny was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and a member of

the American Association of Plastic Surgeons of the Aero Medical Association of the American Medical Association, and of state and local medical societies.

Dr. Chevigny died on July 19, 1960, in Gary, Indiana. He is survived by his wife and eight children.

HAL A. CHILDS

Dr. Hal A. Childs died on June 28, 1961, in Creston, Iowa. He was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, having been a member since 1915.

Hal A. Childs was born on September 2, 1879, in Lenox, Iowa. He attended the University of Iowa, receiving the degree of Bachelor of Arts, and the University of Chicago and Rush Medical College. He received the degree of Doctor of Medicine from Rush Medical College in 1904.

Dr. Childs began the practice of medicine in 1906 in Creston, Iowa. In 1912 he spent a year in Vienna doing postgraduate work, returning to Creston and his established practice. He was associated with Greater Community Hospital.

Dr. Childs retired from active practice in 1937 after suffering a cerebral hemorrhage. However, during World War II, when there was a shortage of doctors, he returned briefly to his practice.

Dr. Childs is survived by his wife and one daughter, Mrs. Robert Tallman of Fargo, North Dakota.

JOHN SHELDON CLARK

Dr. John Sheldon Clark, a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, died in Freeport, Illinois, December 11, 1960, aged 85 years.

John Sheldon Clark received the degree of Doctor of Medicine from Northwestern University Medical School, Chicago, in 1903. He was certificated by the American Board of Otolaryngology in 1925 in one of the first groups to be recognized by that Board.

Dr. Clark conducted a practice as oculist and aurist in Freeport, Illinois, for many years, and was associated with the St. Francis Hospital and the Freeport Memorial Hospital.

KOSCIUSKO WALKER CONSTANTINE

Kosciusko Walker Constantine was born July 23, 1877, in Birmingham, Alabama. He attended Johns Hopkins University School of Medicine, receiving the degree of Bachelor of Arts in 1901 and Doctor of Medicine in 1905. He was certificated by the American Board of Ophthalmology in 1935.

Dr. Constantine established his practice in 1907, in Birmingham, Alabama. He was the first physician in Alabama to confine his practice to the specialty of ophthalmology. He was on the staff of Hillman Hospital, where he was attending surgeon and chief of the section of ophthalmology, and was also a member of the staff of St. Vincent's Hospital.

Dr. Constantine was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and a fellow of the American College of Surgeons. He also held membership in the Association for Research in Ophthalmology, the Pan-American Association of Ophthalmology, the American Medical Association, and state and local medical societies.

Dr. Constantine died on April 19, 1961, at Palm Beach, Florida. He is survived by his wife, Mary Branch Trigg Constantine, two daughters, and a son, Dr. Frank Hamilton Constantine, also a member of the Academy.

ANTHONY JOHN CONTY

Anthony John Conty was born on October 4, 1889, in New York City. He received the degree of Doctor of Medicine from University and Bellevue Hospital Medical College (now New York University College of Medicine) in 1913.

For a number of years Dr. Conty engaged in the general practice of medicine, but after 1924 he limited his practice to ophthalmology and otolaryngology. He

was certificated by the American Board of Otolaryngology in 1928.

Dr. Conty maintained his office in Union City, New Jersey, for many years. He was chief of the eye, ear, nose and throat department of the North Hudson Hospital in Weehawken, New Jersey, and senior attending surgeon.

Dr. Conty was a Fellow of the American Academy of Ophthalmology and Otolaryngology and of the American College of Surgeons. He was a past president of Hudson County Medical Society.

Dr. Conty died in New York City on August 1, 1960.

WILLIAM ALBERT COOK

William Albert Cook was born in Charles City, Iowa, on July 10, 1875. He attended Rush Medical College in Chicago, receiving the degree of Doctor of Medicine in 1897. Dr. Cook interned at City Hospital in Charles City, Iowa, from 1897 to 1898. He continued his postgraduate studies at Chicago in 1900, at the Manhattan Eye, Ear and Throat Hospital in 1910, and in Vienna in 1912.

Dr. Cook established his practice in Tulsa, Oklahoma, in 1900. Excepting for the years during which he was continuing his postgraduate studies and a few years of service in the first World War, he remained in Tulsa throughout his medical career. He was chief of staff of the Hillcrest Memorial Hospital, and on the staff of St. John's Hospital.

Dr. Cook was a Fellow of the American Academy of Ophthalmology and Otolaryngology, having been certificated by the American Board of Ophthalmology in 1924. He was also a fellow of the American College of Surgeons. He was past president of the Oklahoma State Medical Association and also of the Tulsa County Medical Society. A member of the American Medical Association, he served as a Member of the House of Delegates of the American Medical Association in 1915, and again from 1923 to 1940.

The memoirs of Dr. Cook are of historical interest. Recorded here, in his description of life in the early days of the statehood of Oklahoma, are memories of Tulsa when nearly everyone carried a gun and most doctors were kept busy dressing gunshot wounds. At the time of his arrival in Tulsa in 1900, ". . . four oil wells had been drilled in the hope of striking oil. Small gas pockets were the only reward." Herein are accounts of the notorious outlaws of the day: Henry Starr, the Cherokee Indian, who periodically collected from area bankers "with the aid of his six-shooter." Other characters who added local color included, Ed Crowell, "King of the Horse Thieves," and his gang, of which Crowell's daughter was actually the brains.

The joint meeting of the Oklahoma Territorial Medical Society and the Indian Territory Medical Society in 1907 at Tulsa, which resulted in the merging of the two societies to form the Oklahoma State Medical Society, is vividly recounted. Dr. Cook wrote that during the meeting, "Two physicians from Guthrie got into a fist fight in the lobby, which provided the principal entertainment."

Dr. Cook died on June 30, 1961, in Tulsa. Preceded in death by his wife, who died in 1940, he is survived by a daughter and two granddaughters who live in France.

JOHN JAMES CRUME

John James Crume was born on September 9, 1867, in Dallas County, Texas. Before studying medicine he taught school. His first contact with medicine was through books on medicine that he read during the years which he taught. In 1896, he passed an oral medical examination, receiving a license to practice medicine in Texas. In 1897 he entered Fort Worth School of Medicine, receiving his medical degree in 1900. (Fort Worth School of Medicine became affiliated with the Medical Department of the Texas Christian University in 1911, which merged with the Baylor University College of Medicine in 1918.)

Dr. Crume began the practice of general medicine in Gorman, Texas, in 1900. In 1906, he moved to Rising Star. Dr. Crume moved to Amarillo, Texas, in 1908, where, because of failing health, he limited his practice to caring for disorders of the eye, ear, nose and throat.

In 1925 he did postgraduate study in these fields in London and Vienna, and was certificated by the American Board of Otolaryngology in 1926. Dr. Crume entered into a partnership in the practice of medicine with Dr. Fred Crumley in 1936 in Amarillo. This partnership was maintained until his retirement in 1950. Dr. Crume was formerly president of the staff and first dean at Northwest Texas Hospital and St. Anthony's Hospital.

Dr. Crume was a Fellow of the American Academy of Ophthalmology and Otolaryngology and of the American College of Surgeons. He also held membership in the Pan-American Medical Congress, the American Medical Association, the Medical Association of Vienna, and state and local medical societies. Dr. Crume was a past president of the Panhandle District Medical Society, and served as its secretary for twenty years. He also served as District Three Councilor of the Texas Medical Association.

Dr. Crume died on August 9, 1960, in Amarillo, Texas. He is survived by his niece, Mrs. Claude Harrison of Amarillo, and two nephews.

ARTHUR MERL CULLER

Arthur Merl Culler was born on December 10, 1899, in Mount Morris, Illinois. He attended Mount Morris College, receiving his degree of Bachelor of Arts in 1920, and the University of Michigan, receiving his degree of Doctor of Medicine in 1926. Dr. Culler interned and served a residency in ophthalmology at the University of Michigan Hospitals in Ann Arbor. From 1928 to 1930, while a resident, he was an instructor in ophthalmology and a Weeks Research Fellow. Dr. Culler was certificated by the American Board of Ophthalmology in 1933.

Dr. Culler began the practice of medicine in 1930, in Dayton, Ohio. During the eleven years of his practice in Dayton, he devoted some of his time to research in physiology of the eye at the Kettering Foundation. From 1941 to 1946 he served in the United States Navy. He was stationed for two years in Efate, New Hebrides, in the South Pacific, and in 1944 was sent to Portsmouth, Virginia, where he completed his service. Dr. Culler accepted a position as associate professor of ophthalmology at Ohio State University, which he took over after his discharge in 1946. He was appointed professor of ophthalmology in 1947. Dr. Culler was chairman of the department of ophthalmology and co-director of the Institute for Research in Vision. He was on the attending staff of Hawkes Hospital of Mount Carmel, Starling-Loving University Hospital, and associated with the staff of St. Francis Hospital and Children's Hospital.

Dr. Culler had been inactive since November 1953, when he suffered a cerebral hemorrhage due to a ruptured aneurysm of the circle of Willis. Though diagnosis had been accurate and the clot removed successfully by surgical intervention, a residual partial left hemiplegia deterred complete recovery. After his convalescence, he turned to painting, a hobby he had started sometime before his illness. During his disablement he spent many hours in this activity.

A Life Fellow of the American Academy of Ophthalmology and Otolaryngology, Dr. Culler was also a fellow of the American College of Surgeons. He held membership in the American Ophthalmological Society, the American Society for Research in Ophthalmology, the American Association for Advancement of Science, the American Medical Association, the Academy International of Medicine, and state and local medical societies.

Dr. Culler died on October 26, 1960, in Honolulu, Hawaii. He is survived by his mother, Mrs. David Culler of Durand, Illinois, and his wife, Mary Swartsel Culler.

MERLE JASPER DAVIS

Merle Jasper Davis was born on February 28, 1918, in Cotulla, Texas. He attended Tarleton State College in Stephenville, Texas, and the University of Texas. He received his degree of Doctor of Medicine from the University of Tennessee College of Medicine in 1942. Dr. Davis did postgraduate work in ophthalmology at Tulane University, and in ophthalmology and otolaryngology at the Memphis Eye, Ear, Nose and Throat Hospital. He

was certificated by the American Board of Ophthalmology in 1955.

Dr. Davis began his medical career in the medical corps of the United States Navy. After his term in service, he established a practice in California, but left to complete his residency in Memphis, where he remained until 1952.

At the time of his death, Dr. Davis was practicing in Terre Haute, Indiana, where he was on the active staff of Saint Anthony Hospital and lecturer in ophthalmology and otolaryngology at the Saint Anthony School of Nursing. He was also on the courtesy staff at Union Hospital and was affiliated with the Associated Physicians and Surgeons Clinic.

Dr. Davis was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and also held membership in the American Medical Association, the Terre Haute Academy of Medicine, the Aesculapian Society of the Wabash Valley, the Vigo County Medical Society, and the Indiana State Medical Association.

Dr. Davis died on October 28, 1960, in Terre Haute, Indiana. He is survived by his wife, Hazel Irene Davis, and a daughter.

WALTER DEAN

Walter Dean was born in Georgetown Indiana, on October 8, 1883. He received the degree of Doctor of Medicine from the University of Louisville Medical Department in 1909. In the following year he served as assistant physician in the Indiana Reformatory before going to Europe to pursue postgraduate study in ophthalmology and otolaryngology at the Royal London Ophthalmic Hospital and Golden Square Throat Hospital (1910-1911) and at the University of Vienna (1911-1912). He was certificated by the American Board of Otolaryngology in 1927.

Dr. Dean engaged in the private practice of his specialties in Louisville, Kentucky, where he was associated with Louisville City, Crippled Children's, St. Anthony's, and Kentucky Baptist hospitals and the Norton Memorial Infirmary. He also was Emeritus Professor and Head of the Department of Ophthalmology and Otolaryngology of his alma mater. He was director of the Hard of Hearing League.

Dr. Dean was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and a Fellow of the American College of Surgeons and of the International College of Surgeons.

Dr. Dean died on March 27, 1961, in Louisville, Kentucky. His son, Dr. Wynant Dean, is also a Fellow of the Academy.

PHILIP HAROLD DECKER

Philip Harold Decker was born on May 7, 1894, in Montgomery, Pennsylvania. He attended Muncy Normal School and the University of Pennsylvania School of Medicine, receiving his degree of Doctor of Medicine in 1917. Dr. Decker did postgraduate study in ophthalmology at the University of Pennsylvania in 1923 and 1924. He was certificated by the American Board of Otolaryngology in 1925.

Dr. Decker began the practice of medicine in 1917, serving in the Medical Corps of the United States Navy. After his term of service in the Navy, he established offices in Williamsport, Pennsylvania, where he practiced ophthalmology and otolaryngology, limiting his practice to ophthalmology after 1946. Dr. Decker was associated with the Williamsport Hospital and the Divine Providence Hospital in Williamsport and the Muncy Hospital in Muncy, Pennsylvania.

In 1936 Dr. Decker spent a few months in Shikarpur, India, at the Shikarpur Hospital and Eye Clinic, where he developed a new corneoscleral flap technique for closing cataract incisions.

Dr. Decker was a Fellow of the American Academy of Ophthalmology and Otolaryngology and of the American College of Surgeons. He was a past president of the Lycoming County Medical Society and held membership in the American Medical Association.

Dr. Decker died on December 8, 1960, in Williamsport. He is survived by his wife, Catherine Sullivan Decker, a son and two daughters.

CHARLES WENTWORTH DeWOLF

Charles Wentworth DeWolf was born on February 7, 1888, in Stow, Massachusetts. He attended Tufts University School of Medicine, receiving the degree of Doctor of Medicine in 1912. Dr. DeWolf was associated with the Massachusetts Eye and Ear Infirmary from 1912 to 1918. From 1918 to 1919 he served in the United States Army.

Dr. DeWolf was certificated by the American Board of Otolaryngology in 1925. He practiced his specialty in Boston and Melrose for many years. He was on the consulting staff of Boston City Hospital and associated with Captain John Adams Hospital in Chelsea, Massachusetts; Melrose Hospital, Melrose, Massachusetts; Middlesex County Hospital, Waltham, Massachusetts; North Reading (Massachusetts) State Sanatorium; and Charles Choate Memorial Hospital in Woburn, Massachusetts.

Dr. DeWolf was a Fellow of the American Academy of Ophthalmology and Otolaryngology. He was past president of the Massachusetts Medical Society, and for many years served as treasurer of the Middlesex-East District Medical Society. He also held membership in the American Medical Association.

Dr. DeWolf died on December 12, 1960, in Wakefield, Massachusetts. He is survived by his wife, Olive Bouve DeWolf; a son, Charles W., Jr., and a daughter, Mrs. Philip W. Hussey, Jr.

ARTHUR ERNEST DOULL

Arthur Ernest Doull was born on May 13, 1904. He received the degree of Doctor of Medicine from Dalhousie University Faculty of Medicine, Halifax, Nova Scotia, in 1928, and in 1944 was certified in Ophthalmology by the Royal College of Physicians and Surgeons of Canada.

Dr. Doull established a private practice in his specialties in Halifax, where he was head of the departments of ophthalmology and otolaryngology at Victoria General Hospital and Halifax Children's Hospital. He was also professor of ophthalmology and otolaryngology and head of those departments in Dalhousie University Faculty of Medicine.

Dr. Doull was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and a member of the Canadian Ophthalmological Society, the Canadian Otolaryngological Society, Nova Scotia Society of Ophthalmology and Otolaryngology, the Canadian Medical Association, the Nova Scotia Division of the Canadian Medical Association, and the Halifax Medical Society.

Dr. Doull's death has been reported to the Academy, date unknown.

RALPH GRAVES FERRIS

Ralph Graves Ferris was born on April 14, 1893, in Gallion, Ohio. He attended Detroit College of Medicine and Surgery, receiving the degree of Doctor of Medicine in 1918. After an internship at Harper Hospital in Detroit, Dr. Ferris established a practice of medicine in Detroit in 1919.

After postgraduate work at the University of Michigan Medical School, Dr. Ferris was certificated by the American Board of Otolaryngology in 1931, and thereafter limited his practice to that specialty. He was associated with St. Joseph's Mercy Hospital in Pontiac, Michigan, and was on the staff of William Beaumont Hospital in Royal Oak, Michigan.

Dr. Ferris was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and held membership in the American Medical Association, as well as in state and local medical societies.

Dr. Ferris died on January 29, 1961, in Royal Oak, Michigan. He is survived by his wife, Marian L. Ferris, and a daughter.

PHILIP HAROLD FINK

Philip Harold Fink was born on August 20, 1893, in Brooklyn, New York. He received the degree of Doctor of Medicine from Long Island College Hospital, Brooklyn, in 1915. He interned at Swedish Hospital in Brooklyn. Dr. Fink's medical edu-

cation was interrupted by military service in World War I, but he completed a residency at Manhattan Eye, Ear and Throat Hospital Postgraduate School in 1926 and continued his postgraduate studies in Vienna and Budapest. He was certificated by the American Board of Ophthalmology in 1942.

Dr. Fink was formerly clinical assistant in ophthalmology at New York Polyclinic Hospital and visiting ophthalmologist at the City Hospital. In 1943 he gave up all hospital and clinic affiliations to accept the position of associate examining ophthalmologist for the New York State Workmen's Compensation Board.

Dr. Fink was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and was a member of the Medical Society of Workmen's Compensation Board, New York State, and of the American Medical Association, and of state and local medical societies.

Dr. Fink died March 27, 1961. He is survived by his wife.

LOUIS ZOLO FISHMAN

Louis Zolo Fishman was born in Chicago, Illinois, on November 18, 1904. He received the degree of Doctor of Medicine from the University of Illinois College of Medicine, Chicago, in 1928. He was a specialist certificated by the American Board of Otolaryngology in 1934.

Dr. Fishman began the practice of his specialty in Chicago. He was formerly chief of the department of otolaryngology at Edgewater Hospital and on the guest staff of Grant Hospital. He was on the faculty of his alma mater and was also associated with the Research and Educational Hospitals of the University of Illinois. After moving to California, he practiced in San Francisco, where he was chief of the department of otolaryngology at Greens' Eye Hospital and on the courtesy staffs of Mount Zion and French hospitals. At the time of his death on December 17, 1960, Dr. Fishman was chief of the department of otolaryngology at the Kaiser Foundation Hospital in Vallejo, California. He was especially interested in fenestration surgery and plastic surgery of the ear and nose.

Dr. Fishman was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and was a member of the American Medical Association and of state and local medical societies. He also held membership in Xizengnis (University of Vienna and Polyclinic of Vienna) and in the American Medical Association of Vienna.

FRANK CARMINE FURLONG

Frank Carmine Furlong was born in Italy on June 24, 1890. His family came to the United States in 1891. He attended Albany Medical College, receiving his degree of Doctor of Medicine in 1914. Dr. Furlong interned at Albany Memorial Hospital in 1914 and 1915 and at Blackwells Island Workhouse during 1915 and 1916. He did postgraduate study in otorhinolaryngology in Vienna from 1930 to 1931, and did further work in laryngology at Harvard University Medical School in 1932. He was certificated by the American Board of Otolaryngology in 1942.

Dr. Furlong began the practice of medicine in Poughkeepsie, New York, in 1917, where he remained for 13 years. He was associated with St. Francis Hospital and Vassar Brothers Hospital. After finishing his postgraduate studies he established a practice in his specialty in Schenectady, New York, where he became associated with St. Clare Hospital, Ellis Hospital and Schenectady City Hospital. He was chief of the Out Patient Department at City Clinic in Schenectady, and on the staff of Community Hospital in Cobleskill, New York.

Dr. Furlong was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and held membership in the American Association of Plastic Surgeons and the American Medical Association. He was a charter member of the International College of Surgeons. He was a past president of the Eastern New York Eye, Ear, Nose and Throat Association and the Schenectady County Medical Society, and also of the Alumni Association of Albany Medical College.

Dr. Furlong died on February 12, 1961, while vacationing in Fort Lauderdale, Florida. He is survived by his wife.

SAMUEL THEODORE GLASFORD

Samuel Theodore Glasford was born on November 28, 1880, in Pawnee, Nebraska. He attended Barnes Medical School in St. Louis, receiving his degree of Doctor of Medicine in 1902.

Dr. Glasford established a general practice in 1902 which he continued for thirteen years. In 1915 he did postgraduate studies in eye, ear, nose and throat at Tulane University in New Orleans. After completing his studies, he practiced these specialties in Pekin, Illinois, until his retirement in August 1959.

During the later years of his life, Dr. Glasford made several extensive trips to foreign countries, one of which was a six-month safari from Cairo, Egypt, to Capetown, South Africa. He also visited Europe, India, the Middle East, the Far East, Mexico, and all of South America.

Dr. Glasford was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology and held membership in the American Medical Association, as well as in state and local medical and specialty societies.

Dr. Glasford died on September 17, 1960, in Pekin. He is survived by his wife, Mary Clark Glasford, and a daughter, Mrs. Richard Black of LaGrange, Illinois.

JOSEPH ISADORE GOUTERMAN

Joseph Isadore Gouterman was born on January 1, 1894, in Warsaw, Poland. He attended the University of Sorbonne in Paris and Temple University School of Medicine in Philadelphia. He received his degree of Doctor of Medicine in 1919 from Temple University. Dr. Gouterman interned at Philadelphia General Hospital from 1919 to 1921, and did postgraduate studies at the University of Pennsylvania Graduate School of Medicine. He was certificated by the American Board of Ophthalmology in 1929.

Dr. Gouterman served as assistant ophthalmologist at Philadelphia General Hospital, as ophthalmologist at the Skin and Cancer Hospital, and as chief ophthalmologist at the Philadelphia Psychiatric Hospital. He was associated with the Wills Eye Hospital and the Graduate Hospital of the University of Pennsylvania at the time of his death.

Dr. Gouterman was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology and a fellow of the American College of Surgeons. He held membership in the Pan-American Medical Association, the American Medical Association, and state and local medical societies.

Dr. Gouterman was a veteran of World War I and World War II.

Dr. Gouterman died on August 9, 1960, in Philadelphia. He is survived by his wife, Mildred F. Gouterman.

HENRIK SOFAS GRAESER

Henrik Sofas Graeser was born on November 26, 1908, in Tyler, Minnesota. He attended Hamline University in St. Paul, Minnesota; Sacramento Junior College of Sacramento, California, and the University of Arkansas, receiving the degree of Doctor of Medicine from the latter institution in 1936. Dr. Graeser interned at the Sacramento County Hospital from 1936 to 1937. He was certificated by the American Board of Ophthalmology in 1952.

Dr. Graeser began the practice of medicine in 1937 at Woodland, California. He did postgraduate work in ophthalmology at Northwestern University in 1946, and was briefly associated with the Veteran's Administration Hospital at Fort Miley, California. From 1946 to 1947 he was consultant at Travis Army Air Force Base and served for a short period with the Medical Facility at Vacaville, California. Returning to civilian life he continued the practice of ophthalmology at Woodland, California, where he was on the Senior Staff of Yolo General Hospital. He was also a member of the Senior Staff of Sutter Hospital in Sacramento.

Dr. Graeser was a Fellow of the American Academy of Ophthalmology and Otolaryngology and also held membership in the American Medical Association.

Dr. Graeser died on February 26, 1961, in Sacramento, California. He is survived by his wife, Elizabeth, and two daughters, Mrs. H. E. Lamoree and Miss Elizabeth Graeser.

FREDERICK EVANS GRANT

Dr. Frederick Evans Grant, a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, died in Kalamazoo, Michigan, on January 13, 1961, at the age of 93 years.

Frederick Evans Grant was a Canadian by birth. He received the degree of Doctor of Medicine from the University of Toronto Faculty of Medicine, Toronto, Ontario, in 1893. He became a member of the Academy in 1916; at that time he had already established a practice of ophthalmology and otolaryngology in Kalamazoo, which he continued for many years. He had been retired for about ten years.

HENDRIE WALTER GRANT

Hendrie Walter Grant was born on April 5, 1894, in Calais, Maine. He attended Bowdoin Medical School in Brunswick, Maine, receiving his degree of Doctor of Medicine in 1920. Dr. Grant did postgraduate study in ophthalmology at the University of Minnesota, receiving a Master of Science degree in 1923. He was certificated by the American Board of Ophthalmology the same year.

Dr. Grant began the practice of medicine in St. Paul, Minnesota. He was on the staffs of the Charles T. Miller Hospital and the University Hospitals. He had been on the faculty of the University of Minnesota since 1920 and had held the post of assistant professor in the department of ophthalmology at the University of Minnesota since 1946.

Dr. Grant was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology. He had rendered the Academy distinguished service as associate to the Secretary for Home Study in charge of Otolaryngology from 1946 through 1953 and as a member of the Instruction Section Faculty for many years. Dr. Grant received the honor award of the American Academy of Ophthalmology and Otolaryngology in 1947.

Dr. Grant also held membership in the American Ophthalmological Society, the Pan-American Association of Ophthalmology, the Association for Research in Ophthalmology, the International Congress of Ophthalmology, the Minnesota Academy of Science, the American Medical Association and state and local medical societies. He was a veteran of World War I.

Dr. Grant died on August 5, 1960, in St. Paul, Minnesota. He is survived by his wife, Elizabeth J. Grant, a son and a daughter.

REX E. GREER

Rex E. Greer was born on January 13, 1907, in Ardmore, Oklahoma. He attended the University of Oklahoma School of Medicine, receiving his degree of Doctor of Medicine in 1934. Dr. Greer interned at St. Joseph's Hospital in Denver from 1932 to 1934. He served in the United States Air Force from 1934 to 1938 and from 1940 to 1946. In 1946 and 1947 he was a resident in Otolaryngology at Barnes Hospital in St. Louis and from 1947 to 1949 at St. Luke's Hospital in Cleveland. He was certificated by the American Board of Otolaryngology in 1950.

Dr. Greer practiced medicine in Midland, Texas, for a short while, where he was associated with Midland Memorial Hospital and the Western Clinic and Hospital. Soon after his certification, he moved to Amarillo, Texas, to engage in the practice of his specialty. Here he was associated with Northwest Texas Hospital and St. Anthony's Hospital. He was formerly associated with the Veteran's Administration and at one time was a company physician for the Santa Fe Railway. He served on the Texas Commission for the Blind.

Dr. Greer was a Fellow of the American Academy of Ophthalmology and Otolaryngology and held membership in the Southeastern Medical Society, the American Medical Association, and state and local medical societies.

Dr. Greer died on November 7, 1960, in Amarillo. He is survived by his wife, Blanche Greer, and a son.

EDWARD WILLIAMS HARRIS

Edward Williams Harris was born on January 10, 1902, in Columbus, Ohio. He attended Ohio State University, receiving the degree of Bachelor of Science in 1923,

and Ohio State University School of Medicine, receiving the degree of Doctor of Medicine in 1925. Dr. Harris interned at Methodist Hospital in Indianapolis, then did postgraduate work in otolaryngology at the University of Pennsylvania Postgraduate School in 1926 and 1927 and again in 1929. Dr. Harris was certificated by the American Board of Otolaryngology in 1929.

Dr. Harris served in the United States Army Medical Corps from October 1942 to August 1946. He was chief of the eye, ear, nose and throat service in Station Hospital at March Field, California, from January, 1943 to March, 1946. From April to August of 1946 he was chief of the eye, ear, nose and throat service in Madigan General Hospital, Fort Lewis, Washington. He terminated his active duty with the rank of Lieutenant Colonel.

Dr. Harris was appointed professor and head of the Department of Otolaryngology at Ohio State University School of Medicine in 1953. He was associated with Children's Hospital, Grant Hospital, Mount Carmel Hospital, Saint Anthony's Hospital, and Starling-Loving University Hospital.

Dr. Harris was a Fellow of the American Academy of Ophthalmology and Otolaryngology. He was past president of the Columbus Academy of Medicine, and held membership in the American Broncho - Esophagological Association, the American Rhinologic Society, the Columbus Ophthalmological and Otolaryngological Society, the Columbus Surgical Society, the Medical Review Club, the Medical Forum Club and the American Medical Association. He was an Honorary Fellow of the Royal Society of Medicine, London.

Dr. Harris died on March 30, 1961, in Columbus, Ohio. He is survived by his wife and a daughter.

LYMAN HOWARD HEINE

Lyman Howard Heine was born in Hooper, Nebraska, in 1909. He received the degree of Doctor of Medicine from the University of Nebraska College of Medicine in 1933. After an internship at City Hospital, Akron, Ohio, he completed a residency in otolaryngology at Massachusetts Eye and Ear Infirmary and was certificated by the American Board of Otolaryngology in 1937.

Upon completion of his residency, Dr. Heine began the practice of his specialty in Fremont, Nebraska, in association with his father. He served on the staff of Dodge County Community Hospital, and was an Associate Professor of Otolaryngology in the University of Nebraska College of Medicine, Omaha.

Dr. Heine was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and a member of the American Laryngological, Rhinological and Otological Society, of the American Medical Association, and of state and local medical societies.

Dr. Heine died in Fremont on March 22, 1961, at the age of 51 years.

WILLIAM HEWSON

William Hewson was born on June 5, 1884, in Philadelphia, Pennsylvania. He attended the University of Pennsylvania, where he received a Bachelor of Arts degree in 1906 and his degree of Doctor of Medicine in 1910. Dr. Hewson interned at the Pennsylvania Hospital in Philadelphia from 1910 to 1912. He did postgraduate study in otolaryngology at the University of Pennsylvania Graduate School of Medicine in 1924. Dr. Hewson was certificated by the American Board of Otolaryngology in 1929.

Dr. Hewson practiced in Philadelphia, where he was associated with Pennsylvania Hospital, Presbyterian Hospital, Methodist Hospital, Children's Hospital and the University of Pennsylvania Hospital. He was formerly an assistant professor of otolaryngology at the University of Pennsylvania School of Medicine, and also consulting otolaryngologist at Abington Hospital in Abington, Pennsylvania, in charge of ear, nose and throat work at Overbrook School for the Blind at Overbrook, Pennsylvania, and on the staff of Bryn Mawr Hospital in Bryn Mawr, Pennsylvania.

Dr. Hewson was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology. He also held mem-

bership in the American Laryngological, Rhinological and Otological Society, and the American Medical Association.

Dr. Hewson died on October 29, 1960, in Philadelphia. He is survived by his wife, Nancy Stokes Hewson, four sons and one daughter.

ERNEST CAIN HILLYER

Ernest Cain Hillyer was born in Huntsville, Illinois, on September 12, 1901. After graduation from the University of California at Los Angeles in 1927, he entered the University of Colorado School of Medicine in Denver, where he received the degree of Doctor of Medicine in 1932.

Dr. Hillyer began his medical career in 1933 as a general practitioner. In 1936 he entered the University of Rochester (New York) School of Medicine as a resident in ophthalmology and an instructor. After completing his residency, he served as a Captain in the Medical Corps of the United States Navy from 1940 through 1945. Following his separation from the Navy, he began the practice of his specialty in Los Angeles, where he was consultant and instructor in ophthalmology at the Veterans Hospital in West Los Angeles and clinical instructor in ophthalmology in the University of California at Los Angeles.

Dr. Hillyer was a Fellow of the American Academy of Ophthalmology and Otolaryngology and of the American College of Surgeons. He also held membership in the Pacific Coast Oto-Ophthalmological Society, the Aero Medical Association, the Association of Military Surgeons of the United States, the American Medical Association, and state and local medical societies.

Dr. Hillyer died on December 28, 1960, at the age of 59 years.

WILLIAM PETER HOFMANN

William Peter Hofmann was born in 1893 at Cosgrove, Iowa. He attended Creighton University, from 1911 to 1912, and the State University of Iowa, where he received his Bachelor of Arts degree in 1914 and his degree of Doctor of Medicine in 1918. Dr. Hofmann interned at the Montreal General Hospital in Montreal, Canada, in 1918 and 1919. He did postgraduate study in ophthalmology and otolaryngology at the New York Eye and Ear Infirmary.

Dr. Hofmann joined Dr. C. D. Martin in the practice of medicine in Davenport, Iowa, in 1920. He established his private practice in 1922. He was associated with St. Luke's Hospital and Mercy Hospital, where he was past president of the staff. In 1939 he was appointed resident ophthalmologist for the United States Employee's Compensation Commission.

Dr. Hofmann was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology. He held membership in the American Society of Ophthalmologic and Otolaryngologic Allergy, the Illinois Medical Society, the American Medical Association, and state and local medical societies.

Dr. Hofmann died on October 23, 1960, in Davenport. He is survived by his wife, Marie Burnett Hofmann, a daughter, and five sons, two of whom are in the medical profession; Dr. William B. Hofmann of Oak Park, Illinois, and Dr. Ronald J. Hofmann of Chicago.

DELOS WYLIE HOGUE

Delos Wylie Hogue was born in 1870 in Monmouth, Illinois. He attended Monmouth College and Keokuk Medical College in Keokuk, Iowa, receiving his degree of Doctor of Medicine in 1899.

Dr. Hogue began the practice of medicine in Darlington, Wisconsin, in 1899, later moving to Springfield, Ohio, where he practiced until his retirement. He was formerly head of the department of ophthalmology and otolaryngology at Springfield City Hospital.

Dr. Hogue was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and a fellow of the American College of Surgeons. He was a past president of the Clark County (Ohio) Medical Society and held membership in the American Medical Association and state and local medical societies.

Dr. Hogue died on September 2, 1960, in Port Chester, New York. He is survived by a daughter, Mrs. Donald Dennis of Rye, New York.

STACY CLAIBOURNE HOWELL

Stacy Claibourne Howell was born in Russellville, Arkansas, on March 17, 1899. He attended the University of Georgia, receiving the degree of Bachelor of Science in 1921 and the degree of Doctor of Medicine in 1922. Dr. Howell interned at St. Vincent's Infirmary in Little Rock, Arkansas, in 1922 and 1923.

Dr. Howell began the practice of medicine in 1923 in Little Rock, Arkansas. He was instructor in the University of Arkansas School of Medicine from 1926 to 1930. From 1930 to 1932 he did postgraduate study at Wills Eye Hospital in Philadelphia, and was certificated by the American Board of Ophthalmology in 1937. Dr. Howell moved to Atlanta, Georgia, shortly thereafter to engage in the practice of his specialty. In 1944 he was appointed assistant professor of clinical ophthalmology at Emory University, School of Medicine. In 1950 he was elected to associate professorship in the department and held that post until his death. Dr. Howell was on the staff of Georgia Baptist Hospital and Grady Hospital of Emory University.

Dr. Howell was a Fellow of the American Academy of Ophthalmology and Otolaryngology and held membership in the Atlanta Eye, Ear, Nose and Throat Society, the Georgia Society of Ophthalmology and Otolaryngology, the Southern Medical Association and the American Medical Association.

Dr. Howell died on March 11, 1961, in Atlanta. He is survived by his wife, Edna Miller Howell, and a daughter, Mrs. Thomas D. Brooks.

HOLLIS CARLYLE INGRAM

Hollis Carlyle Ingram was born in Zumbro Falls, Minnesota, on July 14, 1905. After graduation from Rollins College, he received his degree of Doctor of Medicine from Tulane University School of Medicine in 1934. He interned at Wesley Hospital, Wichita, Kansas, before entering a residency in ophthalmology at Tulane, which was completed in 1937. He was certificated by the American Board of Ophthalmology in 1939.

After completion of his postgraduate study, Dr. Ingram began the practice of his specialty in Orlando, Florida, in association with his father. Except for Army Air Force service from 1942 to 1946, he continued his practice in Orlando until his death on June 11, 1961.

Dr. Ingram was a member of the Senior Active Staff of Orange Memorial Hospital in Orlando. He had been Chief of the Division of Ophthalmology and Otolaryngology for several years, and had served as president of the staff during 1956 and 1957.

Dr. Ingram was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and of the Academy Internationale of Medicine. He was also a member of the Southern Medical Association, of the American Medical Association, and of state and local medical societies. In 1950 he had served as president of Orange County Medical Society. For several years he had been on the Florida Council for the Blind.

Surviving Dr. Ingram are his wife, Frances Howard Ingram, a son, and a daughter.

CHEVALIER LAWRENCE JACKSON

Chevalier Lawrence Jackson was born on August 19, 1900, in Pittsburgh, Pennsylvania. He attended the University of Pennsylvania, receiving a Bachelor of Arts degree in 1922 and his degree of Doctor of Medicine in 1926. Dr. Jackson interned at Chestnut Hill Hospital in Philadelphia from 1926 to 1927. He did postgraduate study in laryngology and bronchoesophagology at the University of Pennsylvania in 1927 and 1928, and in 1930 received the degree of Master of Science in Medicine. Dr. Jackson was certificated by the American Board of Otolaryngology in 1932.

Dr. Jackson began the practice of his specialty in Philadelphia in 1928. In 1930, Dr. Chevalier Jackson (his father) and he were co-founders of the Chevalier Jackson Clinic, specializing in bronchoesophagology. The clinic was named after the

elder Dr. Jackson, who died in 1958. Dr. Chevalier Lawrence Jackson became director of the clinic in 1938.

Dr. Jackson was professor and head of the department of laryngology and bronchoesophagology at the University of Pennsylvania. He was an Honorary Member of the Faculty of Biology and Medical Sciences at the University of Chile, and Professor Honoris Causa, Faculty of Medicine at the University of Montevideo in South America.

During his career, Dr. Jackson traveled extensively, giving lectures and reporting on recent advances and developments in bronchoesophagology in hospitals, clinics and universities throughout the world.

Dr. Jackson was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and had served as a vice president of the Academy in 1944. He was founder and secretary-treasurer of the International Bronchoesophagological Society, founder and secretary of the Pan-American Association of Oto-Rhino-Laryngology and Bronchoesophagology, past president of the American Bronchoesophagological Association, and past president of the American College of Chest Physicians. Dr. Jackson was vice president of the American Laryngological, Rhinological and Otological Society in 1957. He was past president of the Philadelphia Laryngological Society from 1956 to 1958, and past president of the Laennec Society of Philadelphia. Dr. Jackson was a fellow of the American College of Surgeons, and a fellow of the College of Physicians of Philadelphia. He held membership in the American Laryngological Association, the American Association for Thoracic Surgeons, the American Society of Head and Neck Surgery, the New York Society for Laryngology and Otology, the New York Bronchoscopic Club, the Philadelphia Bronchoscopic Club, the American Medical Association and state and local medical societies.

Dr. Jackson was on the Advisory Board of the American Hospital of Paris, Commander of the Order of the Liberator San Martin (Argentina, 1958), Chevalier, Legion of Honor (France, 1956) and a member of twenty-two foreign medical societies. He was editor of the International Directory of Otolaryngology.

Dr. Jackson died on January 13, 1961, at home in Schwenksville, Pennsylvania. He is survived by his wife, Hilda Cowling Jackson, and a daughter.

GEORGE FRANCIS JOSEPH KELLY

George Francis Joseph Kelly was born on November 29, 1893, in Philadelphia, Pennsylvania. He attended the University of Pennsylvania, receiving his degree of Doctor of Medicine in 1915. Dr. Kelly was certificated by the American Board of Ophthalmology in 1933.

Dr. Kelly began the practice of medicine in Philadelphia in 1920. He was senior consulting ophthalmologist at Children's Hospital and chief of the section of ophthalmology at St. Agnes Hospital. Dr. Kelly was associate professor of ophthalmology at the University of Pennsylvania School of Medicine, and at the University of Pennsylvania Graduate School of Medicine.

Dr. Kelly was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology and held membership in the American Medical Association.

Dr. Kelly died on October 6, 1960, at home in Merion, Pennsylvania. He is survived by a brother, Edward J. Kelly, and two sisters.

JOHN ARTHUR KERST

John Arthur Kerst was born on April 22, 1895, in Springfield, Illinois. He attended Northwestern University Medical School, receiving his degree of Doctor of Medicine in 1928. Dr. Kerst interned at Evanston Hospital in Evanston, Illinois, in 1928 and 1929.

Dr. Kerst began the practice of medicine in Springfield, Illinois, in 1930. In 1934 he left Springfield to continue his studies in ophthalmology at the Massachusetts Eye and Ear Infirmary, where he was special resident and house officer. Dr. Kerst later did work in ophthalmology at the New York Postgraduate Medical School and Hospital and also at George Washington University. Dr. Kerst was certificated by the American Board of Ophthalmology in 1940. From 1942 to

1946 he served in the Medical Corps of the United States Army. He was an instructor in ophthalmology from 1947 to 1961, and a clinical assistant from 1948 to 1952, at Northwestern University.

Dr. Kerst was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and held membership in the American College of Allergists, in the American Medical Association, and in state and local medical societies.

Dr. Kerst died on March 10, 1961, in Springfield. He is survived by a brother, Harry G. Kerst.

ALFRED KESTENBAUM

Alfred Kestenbaum was born on February 18, 1890, in Austria. He received his degree in medicine from the University of Vienna, Austria, in 1913.

Dr. Kestenbaum began the practice of medicine in Vienna, Austria, in 1913. He worked for a time as private assistant to Professor Ernst Fuchs. From 1919 to 1938 he worked under Professor Poetzl as a consultant at the Neuropsychiatric Institute in Vienna. Dr. Kestenbaum came to the United States in 1938, and received his license to practice medicine in 1939. His practice has always been limited to ophthalmology. He was certificated by the American Board of Ophthalmology in 1959. He was associate clinical professor at New York University College of Medicine; associate surgeon at Bellevue Hospital; consulting ophthalmologist at New York Eye and Ear Infirmary; associate attending ophthalmologist at University Hospital (New York); and associate consulting ophthalmologist at Goldwater Memorial Hospital.

Dr. Kestenbaum was a Fellow of the American Academy of Ophthalmology and Otolaryngology. He also held membership in the Pan-American Association for Ophthalmology, the New York Society for Clinical Ophthalmology, the Virchow Society of New York City, the American Medical Association, and state and local medical societies. He was an honorary member of the Dallas Academy of Ophthalmology and Otolaryngology, a corresponding member of the Mexican Society for Ophthalmology and of the Austrian Neurological Society.

Dr. Kestenbaum died in New York City on July 17, 1961. He is survived by his wife, Dr. Ada Kestenbaum; a son, William W. Kestenbaum; and a daughter, Dr. Helen C. Meyers.

PERLEY HOWE KILBOURNE

Perley Howe Kilbourne was born in Miltonville, Ohio, on March 14, 1880. He attended Otterbein College and Western Reserve University School of Medicine, receiving his degree of Doctor of Medicine from the latter institution in 1908. Dr. Kilbourne interned at St. Alexis Hospital in Cleveland from 1907 to 1909. In 1920, he did postgraduate study in otolaryngology at the University of Pennsylvania and later, in 1930, went to Vienna for further postgraduate work at the University of Vienna. Dr. Kilbourne was certificated by the American Board of Otolaryngology in 1939.

Dr. Kilbourne began the practice of medicine in 1909, in Dayton, Ohio. From 1914 to 1920 in addition to his general practice he became anesthetist at Miami Valley Hospital. He was associated with Miami Valley Hospital as chief of staff. He was on the courtesy staff of Good Samaritan Hospital, St. Elizabeth Hospital, and College Hospital. He also served as consultant on the staff of Dayton State Hospital and Stillwater Sanatorium (District Tuberculosis Hospital) at Dayton.

Dr. Kilbourne was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology. He was past president of the Montgomery County Medical Society and held membership in the American Medical Association.

Dr. Kilbourne died in Dayton, Ohio, on July 25, 1960. He is survived by a son and three daughters.

EDGAR WILLIAM KILLIAN

Edgar William Killian was born in Cicero, Illinois, on February 26, 1917. He attended the University of Chicago, receiving the degree of Bachelor of Arts in 1940, and Loyola University Medical School, from which he received the degree of Doctor of Medicine in 1944. Dr.

Killian served a residency in obstetrics and gynecology at the Lewis Memorial Maternity Hospital in Chicago. He elected not to continue in that specialty, but entered the field of otolaryngology. He was certificated by the American Board of Otolaryngology in 1951.

Dr. Killian began the practice of medicine in Illinois in 1945. However, in 1951, after being certificated by the Board, he moved to Logansport, Indiana, establishing his practice of otolaryngology. He was associated with St. Joseph's Hospital and Memorial Hospital in Logansport. He later moved to Streator, Illinois.

Dr. Killian was a Fellow of the American Academy of Ophthalmology and Otolaryngology and held membership in the American Medical Association. He also was a member of the Chicago Medical Society and Cass County Medical Society.

Dr. Killian died on January 4, 1961, in Rochelle, Illinois. He is survived by his wife.

MAURICE C. LANDAU

Maurice C. Landau was born on April 1, 1910, in Budapest, Hungary. He received his degree of Doctor of Medicine from the Medizinische Fakultat der Universitat in Vienna, Austria, in 1933. Dr. Landau interned at Beekman Street Hospital in New York City, Margaret Hague Maternity Hospital of Jersey City Medical Center, and at St. Mary's Hospital in Saginaw, Michigan. His residency training was received at Goldwater Memorial Hospital in New York City. He was certificated by the American Board of Ophthalmology in 1948.

Dr. Landau began the practice of medicine in Rochester, New York, in 1934. Later, after continuing his medical studies in ophthalmology, he limited his practice to that specialty. He was attending ophthalmologist at the Children's Eye Clinic, Department of Health of New York City, and instructor and lecturer at the New York Polyclinic Medical School and Hospital. He was also on the staff of Mary McClellan Hospital in Cambridge, New York, and Glens Falls Hospital in Glens Falls, New York.

Dr. Landau was a Fellow of the American Academy of Ophthalmology and Otolaryngology and held membership in the Northeastern Eye and Ear Society of the State of New York and the American Medical Association.

Dr. Landau died on September 14, 1960, at Glens Falls. He is survived by his wife, Elsie Landau, a son and two daughters.

BERNARD JOHN LARKIN

Bernard John Larkin was born on December 19, 1886, at Loogootee, Indiana. He received his degree of Doctor of Medicine from St. Louis University School of Medicine in 1912. Dr. Larkin served an internship and residency at St. Vincent's Hospital in Indianapolis from 1912 to 1914, and did postgraduate study in ophthalmology at the New York Eye and Ear Infirmary. He was certificated by the American Board of Ophthalmology in 1917, one of the first group to receive this certification.

Dr. Larkin began the practice of ophthalmology in 1916 in Indianapolis, Indiana. He was formely chief of staff in the department of ophthalmology at Indianapolis General Hospital and on the staff of Indiana University Hospitals, Methodist Episcopal Hospital and St. Vincent's Hospital. Dr. Larkin was professor emeritus of ophthalmology at the Indiana University School of Medicine.

Dr. Larkin was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology and a fellow of the American College of Surgeons. He was a past president of the Indiana State Academy of Ophthalmology and Otolaryngology and a past president of the Indianapolis Academy of Ophthalmology and Otolaryngology. He also held membership in the Association for Research in Ophthalmology, the Pan American Ophthalmological Association, the Chicago Ophthalmological Society, the American Medical Association, and state and local medical societies.

Dr. Larkin died on October 5, 1960, in Indianapolis. He is survived by his wife, Gertrude Larkin.

GRANVILLE ALLEN LAWRENCE

Granville Allen Lawrence was born on November 30, 1883, in Philadelphia, Penn-

sylvania. He attended Temple University School of Medicine in Philadelphia, receiving his degree of Doctor of Medicine in 1909.

Dr. Lawrence began the practice of medicine in 1909 in Philadelphia. After a brief time he joined Dr. Wendell Reber in his offices, pursuing the study of ophthalmology. He was on the staff of Blockley Hospital, and of Samaritan Hospital of Temple University. For a number of years he was chief of the ophthalmology service at Northeastern Hospital in Philadelphia.

Dr. Lawrence was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology and held membership in the American Medical Association and state and local medical societies.

Dr. Lawrence died on August 8, 1960, in Baltimore, Maryland. He was preceded in death by his wife, Matilda Exton Lawrence, who died in 1958. He is survived by a daughter and a son, Granville Allen Lawrence, Jr., M.D., of Nashville, Tennessee, also a member of the Academy.

DAVID TAYLOR LOY

David Taylor Loy was born on October 26, 1908, at Council Grove, Kansas. He attended the University of Kansas, receiving his Bachelor of Science degree in 1931, his Master of Science degree in 1933, and his degree of Doctor of Medicine in 1935. Dr. Loy served an internship at the University of Kansas Medical Center from 1935 to 1936. He planned to enter internal medicine and was about to accept a three-year residency in that field when a physical examination revealed he had rheumatic heart disease. This disclosure prompted him to choose the field of ophthalmology. Dr. Loy served a preceptorship under Dr. Grant Bolding in Manhattan and then under Dr. John A. Billingsley of Kansas City, Kansas. He did postgraduate study in ophthalmology at the University of Kansas. He was certificated by the American Board of Ophthalmology in 1948.

Dr. Loy began the practice of medicine in Washington, Kansas, in 1936, moving to Great Bend, Kansas, in 1939, where he remained in practice until his death. Dr. Loy was a member of the St. Rose Hospital staff and consulting ophthalmologist at Larned State Hospital. Since 1955, frail health had required that he limit his practice to a few hours each day.

Dr. Loy died on November 5, 1960, in Great Bend. He is survived by his wife, Kathryn C. Loy, and a son.

PERCY BLAKELY MACFARLANE

Percy Blakely Macfarlane was born in 1885 in Cherry Valley, Ontario, Canada. He attended the University of Toronto, receiving the degree of Doctor of Medicine in 1908. Dr. Macfarlane did postgraduate work in Vienna and Baltimore.

Dr. Macfarlane began the practice of medicine in Hamilton, Ontario, in 1912. He was associated with Hamilton General Hospital, where he was head of the eye, ear, nose and throat section until 1945.

Dr. Macfarlane was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology. He was president of the Canadian Ophthalmological Society in 1952 and held membership in the Ontario Medical Association, the Hamilton Academy of Medicine, Toronto Academy of Medicine, and the Canadian Medical Association.

Dr. Macfarlane died on May 19, 1961, in Hamilton. He is survived by his wife, Andrina, two daughters and two sons. Both sons are in the medical profession, and one, Dr. E. Blakely Macfarlane, is also a Fellow of the Academy.

JACOB JOHN MANN

Jacob John Mann was born on October 30, 1892, in New York City. He attended the University and Bellevue Hospital Medical College of New York (New York University College of Medicine, New York City); receiving his degree of Doctor of Medicine in 1914. From 1914 to 1916 he interned at Newark City Hospital. Dr. Mann was certificated by the American Board of Otolaryngology in 1934, and by the American Board of Ophthalmology in 1953.

Dr. Mann began the practice of medicine in 1917 at Perth Amboy, New Jersey. He was founder and director of the de-

partment of ophthalmology and otolaryngology at Perth Amboy General Hospital, where he was also past president of the medical staff. He was consulting physician in ophthalmology and otolaryngology at Rahway Hospital, Rahway, New Jersey; South Amboy Memorial Hospital, South Amboy, New Jersey; and Roosevelt Hospital for Diseases of the Chest, in Metuchen, New Jersey.

Dr. Mann was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, a fellow of the American College of Surgeons, and a past president of the Middlesex County Medical Society. He held membership in the American Medical Association and state and local medical societies.

Dr. Mann died on September 13, 1960, in Perth Amboy. He is survived by his wife, Serena, and two daughters.

ROY EARL MASON

Roy Earl Mason was born on February 2, 1883, in Albia, Iowa. He attended the University of Iowa and Saint Louis University School of Medicine, receiving the degree of Doctor of Medicine from the latter institution in 1905.

Dr. Mason began the practice of medicine in 1905 in the Indian Territory. He remained there until 1910, when he moved to Mackay, Idaho, where he engaged in general practice until 1917, at which time he volunteered for military service. He was commissioned as a first lieutenant in the Medical Corps of the United States Army and stationed in New York City, where he became commissary officer at Grand Central Palace Hospital. He was promoted to the rank of captain and then major. During his military assignment in New York, Dr. Mason did postgraduate study of the eye, ear, nose and throat at the Manhattan Eye and Ear Infirmary. He returned to civilian life in 1919, continuing his training in eye clinics in St. Louis. In 1920 he did postgraduate study in ophthalmology at Harvard Medical Center, completing his formal training. He was certificated by the American Board of Ophthalmology in 1928.

Dr. Mason joined Dr. Harry Hughes in the practice of ophthalmology from 1920 to 1922, then opened his own office in the Frisco Building in St. Louis, where he remained until early 1960. He was a lecturer in ophthalmology at St. Louis University in 1959 and clinical professor of ophthalmology at the University of Missouri School of Medicine at Columbia, Missouri, in 1960. Dr. Mason was granted the honorary degree of Doctor of Humanities by Missouri Valley College in 1957. He was senior consultant on the staff at Evangelical Deaconess Hospital in St. Louis.

Dr. Mason was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology and held membership in the American Medical Association as well as in state and local medical and specialty societies.

Dr. Mason died on November 20, 1960, in St. Louis. He is survived by his wife, Elizabeth Patee Mason.

GERVAIS WARD McAULIFFE

Gervais Ward McAuliffe was born on July 15, 1896, in New York City. He attended Fordham University and Long Island College of Medicine, receiving his degree of Doctor of Medicine in 1920. Dr. McAuliffe was certificated by the American Board of Otolaryngology in 1930. He was also certificated by the American Board of Plastic Surgeons.

In 1942, Dr. McAuliffe was appointed associate professor of otolaryngology at New York Hospital Cornell University Medical College. He served as chief of the eye, ear, nose and throat section at United States Marine Hospital 20 on Staten Island, and was consulting aurist at Fitkin Memorial Hospital in Neptune, New Jersey. Dr. McAuliffe was visiting otolaryngologist at Long Island Home in Amityville, Southampton Hospital, Misericordia Hospital in New York City, New York Hospital, the Payne Whitney Clinic and the State Reconstruction Home in West Haverstraw, New York. Dr. McAuliffe was an honorary surgeon of the New York City Police Department, and consulting otolaryngologist to the editorial board of **Compensation Medicine**.

Dr. McAuliffe was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, a fellow of the American College of Surgeons and of the

International College of Surgeons. He was past vice president and past president of the New York County Medical Society, a member of the American Laryngological, Rhinological, and Otological Society, the Society of Plastic and Reconstructive Surgeons, the American Academy of Compensation Medicine, the American Therapeutic Society, the American Association of Medical Colleges, the Harvey Society, the Pan-Pacific Surgical Association, and the American Medical Editors and Authors Association. He held membership in the American Medical Association and state and local medical societies.

Dr. McAuliffe died on October 17, 1960, in Southampton, New York. He is survived by his wife, Catherine Travis McAuliffe, and one son, Gervais Ward McAuliffe.

GEORGE MARTIN McBEAN

George Martin McBean was born April 20, 1875, in Chicago, Illinois. He attended Hahnemann Medical College in Chicago, receiving his Medical Degree in 1899. Dr. McBean did postgraduate study in 1908 at the University of London, and at the University of Vienna in 1908 and 1914. He was certificated by the American Board of Ophthalmology in 1922. Dr. McBean began the practice of medicine in Chicago in 1899. He was on the Faculty of Hahnemann Medical College and Hospital, and on the attending staff of the Chicago Memorial Hospital.

Dr. McBean was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, a fellow of the American College of Surgeons and held membership in the American Medical Association and state and local medical societies.

Dr. McBean died on August 27, 1960, in Chicago. He is survived by a daughter and a son, Dr. James B. McBean of Rochester, Minnesota, who is also a member of the Academy.

CARL HEBER McCASKEY

Dr. Carl Heber McCaskey, a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and in 1947, President of the Academy, died on October 8, 1960, in Indianapolis, Indiana. He was 83 years old. The obituary notice appears in the January-February TRANSACTIONS, In Memoriam, following page 128.

JOSEPH FRANCIS McGOWAN

Joseph Francis McGowan was born on July 1, 1903, in Barnesboro, Pennsylvania. He attended Youngstown College in Ohio, receiving a Bachelor of Science degree, and the University of Maryland School of Medicine, receiving his degree of Doctor of Medicine in 1929. Dr. McGowan interned at St. Elizabeth's Hospital in Washington, D. C., from 1929 to 1930. He did postgraduate work in otolaryngology at the University of Indiana, the University of Chicago, Rush Medical College, Cook County Postgraduate School and the Illinois Eye and Ear Infirmary. He also did postgraduate study in ophthalmology at Northwestern University, George Washington University, and Columbia University Postgraduate School. From 1936 to 1938 he was an instructor at the Episcopal Eye, Ear and Throat Hospital School of Nursing of the Washington Medical Center, in Washington, D. C. Dr. McGowan was certificated by the American Board of Otolaryngology in 1942.

Dr. McGowan began the practice of medicine in 1937 in Asheville, North Carolina. He was on the staff of Aston Park Hospital and St. Joseph's Hospital, and of Memorial Mission Hospital of Western North Carolina, all in Asheville.

Dr. McGowan was a Fellow of the American Academy of Ophthalmology and Otolaryngology and of the American College of Allergists. Among the societies in which he held membership were the American Academy of Plastic Surgery, the American Otorhinologic Society for Plastic Surgery, the Pan-American Association of Ophthalmology, the Pan American Association of Oto-Rhino-Laryngology and Broncho-Esophagology, the American Medical Association, the Southern Medical Association, the New York Academy of Science, and state and local medical societies.

Dr. McGowan died on July 17, 1960, in Asheville, North Carolina. He is survived

by his wife, Frances Genevieve Oddi McGowan, one son and four daughters.

ROY BARTLETT METZ

Dr. Roy Bartlett Metz, a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, died in Cleveland, Ohio, on February 12, 1961, at the age of 86 years.

Roy Bartlett Metz was born in Clyde, Ohio, in 1874. He received the degree of Doctor of Medicine from Western Reserve University Medical Department, Cleveland, in 1901.

Early in Dr. Metz's medical career he limited his practice to the specialty of ophthalmology. He became a Fellow of the Academy in 1912, and was certificated by the American Board of Ophthalmology in 1930. He was an associate professor of ophthalmology at his alma mater, and was associated for many years with St. Luke's Hospital in Cleveland.

Dr. Metz was also a fellow of the American College of Surgeons and held membership in the American Medical Association and state and local medical societies. He was formerly treasurer of the Cleveland Academy of Medicine.

GEORGE HENRY MOORE

Notice of the death of Dr. George Henry Moore on October 1, 1953, in Upper Darby, Pennsylvania, was recently received in the Academy office. Records are incomplete as to his schooling and practice; however, Dr. Moore was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, having been a member since 1919. The year of his birth was 1872.

ROBERT LOWRY MOORHEAD

Robert Lowry Moorhead was born on July 12, 1881, in Brooklyn, New York. He attended Columbia University College of Physicians and Surgeons, receiving his degree of Doctor of Medicine in 1904. Dr. Moorhead interned at St. John's Episcopal Hospital in 1904 and 1905, and at the German Hospital in Brooklyn in 1905 and 1906. He did postgraduate study in Berlin and Vienna in 1906 and 1907. Dr. Moorhead was certificated by the American Board of Otolaryngology in 1925.

Dr. Moorhead began the practice of medicine in 1906 in Brooklyn, New York. He was formerly chief of the ear, nose and throat department at Brooklyn Hospital, and consulting otolaryngologist at Long Island College Hospital, Norwegian Lutheran Deaconesses' Home and Hospital, St. Mary's Hospital, Bushwick Hospital, Cumberland Hospital, and Wyckoff Heights Hospital. He had also been senior surgeon at the Brooklyn Eye and Ear Hospital. Dr. Moorhead was professor of otolaryngology at the Long Island College of Medicine at Brooklyn.

Dr. Moorhead was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and a fellow of the American College of Surgeons. He also held membership in the American Otological Society, the American Laryngological, Rhinological, and Otological Society, and the American Medical Association. Dr. Moorhead was past president and vice president of the American Bronchoesophagological Association.

Dr. Moorhead died on August 2, 1960, in Brooklyn. He is survived by a daughter, Mrs. Joseph Lathrop.

BEN FRANKLIN MOWRY

Ben Franklin Mowry was born on August 31, 1901, in Mercer County, Ohio. He attended Ohio State University and the University of Tennessee, receiving his degree of Doctor of Medicine from the latter institution in 1928. Dr. Mowry did postgraduate study in otolaryngology at the University of Pennsylvania. He was certificated by the American Board of Otolaryngology in 1936.

Dr. Mowry began the practice of medicine in 1928 at Powhatan Point, Ohio, later moving to Findlay, Ohio. He was associated with the Findlay General Hospital and the Blanchard Valley Hospital.

Dr. Mowry was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and a past president of the Northwestern Ohio Medical Association.

He also held membership in the American Medical Association and state and local medical societies.

Dr. Mowry died on October 28, 1960, in Findlay, Ohio. He is survived by his wife, Vesper Mowry, and a son, also in the medical profession, Dr. Frank M. Mowry.

CARROLL RICHARD MULLEN

Carroll Richard Mullen was born in Bloomington, Illinois, on November 9, 1900. He attended Creighton University in Omaha and Jefferson Medical College of Philadelphia, receiving his degree of Doctor of Medicine in 1926. Dr. Mullen interned at the Philadelphia General Hospital and served a residency in Ophthalmology at the same institution. He was certificated by the American Board of Ophthalmology in 1937.

Dr. Mullen was a charter staff member of the Thomas M. Fitzgerald Mercy Hospital in Darby, Pennsylvania. He was professor and head of the department of ophthalmology at Jefferson Medical College, and ophthalmologist in chief at Jefferson Medical Center. Dr. Mullen was consulting ophthalmologist at J. Lewis Crozier Hospital in Chester, Pennsylvania, active consulting ophthalmologist at Philadelphia General Hospital and at Veterans Administration Hospital, and was executive surgeon at Wills Eye Hospital.

Dr. Mullen was a Fellow of the American Academy of Ophthalmology and Otolaryngology and had received its Award of Merit only last year. He was also a fellow of the American College of Surgeons, and held membership in the Pan-American Association of Ophthalmology, the Association for Research in Ophthalmology, the American Medical Association, the Philadelphia College of Physicians, and state and local medical societies.

Dr. Mullen was chairman of the Section of Ophthalmology of the College of Physicians of Philadelphia and chairman of the first Wills Eye Hospital Conference.

Dr. Mullen died on February 1, 1961, in Philadelphia. He is survived by his wife, Helen Dougherty Mullen, and two daughters.

THOMAS VIGGERS MURTO

Thomas Viggers Murto was born in Albany, New York, on April 7, 1891. He attended St. Charles College and St. Mary's College in Baltimore, receiving the degree of Bachelor of Arts. He received the degree of Doctor of Medicine in 1917 from Georgetown University. His medical studies were continued after a term of service in the United States Navy from 1917 to 1921. Dr. Murto interned at Pittsburgh Hospital in Pittsburgh, Pennsylvania, in 1921 and 1922. He did postgraduate work in ophthalmology and otolaryngology from 1928 to 1930 at the University of Pennsylvania Graduate School of Medicine, from which he received the degree of Master of Medical Science in 1932. Dr. Murto was certificated by the American Board of Otolaryngology in 1932 and by the American Board of Ophthalmology in 1937.

Dr. Murto practiced medicine in Trenton, New Jersey, for many years, retiring in 1954 after a severe cerebral hemorrhage. He was chief of the Eye, Ear, Nose and Throat Service at Mercer Hospital.

Dr. Murto was a Fellow of the American Academy of Ophthalmology and Otolaryngology and held membership in the New Jersey Society of Ophthalmology and Otolaryngology and the American Medical Association.

Dr. Murto died on December 25, 1961, in Trenton. He is survived by his wife, Elizabeth F. Murto, and three sons, Colonel Thomas Viggers Murto, Jr., the Reverend Richard B. Murto, and Dr. Robert E. Murto, also a member of the Academy, and two daughters, Mrs. Walter Ruddy, and Mrs. D. L. Culliton.

ELMER WILLIAM O'BRIEN

Elmer William O'Brien was born on January 28, 1897, in Webster, New York. He attended Niagara University and the University of Buffalo School of Medicine, receiving his degree of Doctor of Medicine in 1920. Dr. O'Brien interned at St. Mary's Hospital in Rochester, New York, in 1920 and 1921. He was certificated by the American Board of Otolaryngology in 1940.

Dr. O'Brien established his practice

of medicine in Rochester, New York, in 1921. He was a specialist in bronchoesophagology, and was associated as consulting bronchoesophagologist with Rochester General Hospital, Genesee Hospital, Highland Hospital, all in Rochester, and with the Dansville General Hospital of Dansville, New York. He was senior bronchoesophagologist at Monroe County Infirmary and at Rochester State Hospital, and consulting bronchoesophagologist and otorhinolaryngologist at Park Avenue Hospital and St. Mary's Hospital.

Dr. O'Brien was a Fellow of the American Academy of Ophthalmology and Otolaryngology. He held membership in the American Broncho - Esophagological Association, the American Laryngological, Rhinological and Otological Society, and the American Medical Association. He was a member of the Board of Directors of the Rochester Speech and Hearing Society.

Dr. O'Brien died on September 25, 1960, in Rochester, New York. He is survived by his wife, Lisette O'Brien, two sons and four daughters.

GERALD RICHARD O'BRIEN

Gerald Richard O'Brien was born on November 1, 1895, in Rome, New York. He attended Fordham University, where he received a Bachelor of Science degree and, in 1921, his degree of Doctor of Medicine. Dr. O'Brien interned at St. Mary's Hospital in Brooklyn during the next year. He was certificated by the American Board of Otolaryngology in 1929, and by the American Board of Plastic Surgery in 1939.

Dr. O'Brien began the practice of medicine in 1924 in Brooklyn, New York. He was chief plastic surgeon at Kings County Hospital, consulting plastic surgeon and otolaryngologist at Brooklyn Eye and Ear Hospital, attending plastic surgeon at Holy Family Hospital, clinical professor of surgery at the State University of New York, Downstate Medical Center, and an honorary surgeon to the Brooklyn Police Department.

Dr. O'Brien was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology and a fellow of the American College of Surgeons. He was a founding member of the American Board of Plastic Surgery, a member of the American Society of Plastic and Reconstructive Surgeons and of the American Medical Association.

Dr. O'Brien died on November 29, 1960, in Brooklyn. He is survived by his wife, Genevieve Kelly O'Brien, two sons, Gerald Richard O'Brien, Jr., and Dr. Kenneth J. O'Brien.

JOHN JOSEPH PAGLIUGHI

John Joseph Pagliughi was born in New York City on December 25, 1895. He received the degree of Doctor of Medicine from University and Bellevue Hospital Medical College in New York City (now New York University College of Medicine) in 1920. Dr. Pagliughi's postgraduate study was in the field of otolaryngology. He was certificated by the American Board of Otolaryngology in 1940.

Dr. Pagliughi engaged in the private practice of otolaryngology in Union City, New Jersey. He was professor of clinical otolaryngology and bronchoscopy at Seton Hall College of Medicine and Dentistry in Jersey City. He also served as laryngologist and bronchoscopist for Hudson County Tuberculosis Hospital; associate bronchoscopist at Christ Hospital, Jersey City; and chief of the department of otolaryngology and endoscopy at Berthold S. Pollak Hospital for Chest Diseases in Jersey City.

Dr. Pagliughi was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and a member of the American Medical Association and of state and local medical societies.

Dr. Pagliughi died in Union City on February 15, 1961, aged 65 years.

CARLOS EUGENE PITKIN

Carlos Eugene Pitkin was born on April 18, 1877, in Brunswick, Ohio. He attended Baldwin-Wallace College of Berea, Ohio, receiving the degree of Bachelor of Science in 1898, and Western Reserve University School of Medicine, receiving the degree of Doctor of Medicine in 1902. Dr. Pitkin interned at Lakeside Hospital

in Cleveland from 1902 to 1904. He later continued his postgraduate studies in otolaryngology at the Harvard University School of Medicine under Dr. H. P. Mosher in 1914. He was certificated by the American Board of Otolaryngology in 1925, in the first group to be granted such certification.

Dr. Pitkin began the practice of medicine in 1904 at Cleveland, Ohio. He was consulting otolaryngologist at St. Luke's Hospital. He was also emeritus professor of otolaryngology and head of the department at Western Reserve University, School of Medicine, having been retired because of age in 1947.

Dr. Pitkin was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology. He was past president of the American Broncho-Esophagological Association, and held membership in the American Laryngological, Rhinological, Otological Society, the American Medical Association, and state and local medical societies.

Dr. Pitkin died on February 24, 1961, in Cleveland. He is survived by his wife, Maude Pitkin, and one son, Dr. York N. Pitkin, also a Fellow of the Academy.

GERALD OGDEN POOLE

Gerald Ogden Poole was born on January 20, 1905, in Wilmington, Delaware. He attended the University of Delaware and Hahnemann Medical College and Hospital of Philadelphia, receiving his degree of Doctor of Medicine from the latter institution in 1931. Dr. Poole interned at the Memorial Hospital in Wilmington in 1931 and 1932, and later engaged in postgraduate study in otolaryngology at the Eye and Ear Infirmary in Newark and at the University of Pennsylvania Graduate School of Medicine. Dr. Poole was certificated by the American Board of Otolaryngology in 1942.

Dr. Poole began the practice of medicine in Wilmington, Delaware, in 1932. He was associated with Memorial Hospital, Wilmington General Hospital, Delaware Hospital and St. Francis Hospital.

Dr. Poole was a Fellow of the American Academy of Ophthalmology and Otolaryngology and of the International College of Surgeons. He also held membership in the American Otological Society, the American Medical Association, and the Delaware Medical Society.

Dr. Poole died on September 24, 1960, in Wilmington. He is survived by his wife, Anna Powell Poole, and two daughters.

FRANK POYDRAS POWERS

Frank Poydras Powers was born in Wallace, North Carolina, on October 2, 1903. After graduating from Wake Forest College, he entered University of Pennsylvania School of Medicine, receiving his degree of Doctor of Medicine from that institution in 1927. He interned at James Walker Memorial Hospital in Wilmington, North Carolina, before beginning a residency in otolaryngology at New York Eye and Ear Infirmary.

Upon completion of his postgraduate study, Dr. Powers began the practice of his specialty in Wilmington in January, 1931, but later moved to Raleigh, North Carolina, where he was a member of the staff of Rex Hospital.

Dr. Powers was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and a member of the North Carolina Eye, Ear, Nose and Throat Society, the American College of Allergists, the American Society of Ophthalmologic and Otolaryngologic Allergy, the Southeastern Allergy Association, the International Correspondence Society of Allergists, the American Medical Association, and state and local medical societies.

Dr. Powers is survived by his wife, Rebecca Johnson Powers, a son and two daughters.

AARON ROTH

Aaron Roth was born in New York City in 1887. He received the degree of Doctor of Medicine from University and Bellevue Hospital Medical College(now New York University College of Medicine) in 1908 and interned at Jewish Hospital in Brooklyn from 1909 through 1911. Dr. Roth was certificated by the American Board of Otolaryngology in 1943, and by the American Board of Ophthalmology in 1950.

Dr. Roth limited his practice to otolaryngology in 1914. After taking further postgraduate work in ophthalmology, he added this specialty in 1938. He had been senior attending otologist and associate ophthalmologist in charge of neuro-ophthalmology at Beth-El Hospital, Brooklyn; associate ophthalmologist at Brooklyn Women's Hospital; formerly attending otolaryngologist at Brooklyn Jewish Hospital; formerly associated ophthalmic surgeon at Gouveneur Hospital, New York City; and a member of the courtesy staff (ophthalmology) at New York Eye and Ear Infirmary.

Dr. Roth served as First Lieutenant in the Medical Corps of the United States Army during World War I and as Lieutenant Colonel in World War II. He was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and of the American College of Surgeons. He was also a member of the New York Society for Clinical Ophthalmology, of the American Medical Association, and of state and local medical societies.

Dr. Roth died in Brooklyn on September 9, 1959.

EDMUND WINCHESTER RUCKER, JR.

Edmund Winchester Rucker, Jr., was born in Marion, Alabama, on May 3, 1878. He received the degree of Bachelor of Science from Howard College before entering Denver and Gross College of Medicine (now merged with the University of Colorado School of Medicine), which granted him his degree of Doctor of Medicine in 1904.

In 1908 Dr. Rucker entered the private practice of otolaryngology in Birmingham, Alabama. He served for many years as otolaryngologist at Children's Hospital and St. Vincent's Hospital in Birmingham. Dr. Rucker was certificated by the American Board of Otolaryngology in 1927.

Dr. Rucker was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and a fellow of the American College of Surgeons. He also held membership in the American Medical Association, the Southern Medical Association, and state and local medical societies.

Dr. Rucker died in Birmingham on August 7, 1960, at the age of 82 years.

DEWEY ST. JOHN

Dewey St. John was born on May 25, 1899, in St. Louis, Missouri. He attended Washington University, receiving his degree of Bachelor of Science in chemical engineering in 1920; St. Louis University, receiving his degree of Bachelor of Law in 1925; and St. Louis University School of Medicine, receiving his degree of Doctor of Medicine in 1931. Dr. St. John did postgraduate study in ophthalmology and otolaryngology in Washington University School of Medicine.

Dr. St. John began the practice of medicine in 1931 in St. Louis. He was associated with St. Mary's Hospital, Missouri Baptist Hospital, and Incarnate Word Hospital.

Dr. St. John was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and held membership in the American Medical Association, and state and local medical societies.

Beyond his medical practice, Dr. St. John was interested in law and chemistry.

Dr. St. John died on November 4, 1960, in Clayton, Missouri. He is survived by his wife and a daughter.

JOHN FREDERICK SARNO

John Frederick Sarno was born on September 1, 1906, in Amsterdam, New York. He attended Union College and Albany Medical College, receiving his degree of Doctor of Medicine in 1934. Dr. Sarno interned at Morrisania City Hospital in New York City and took postgraduate work there as a special resident. From 1935 to 1936 he was house surgeon at Bronx Eye and Ear Infirmary. He was certificated by the American Board of Otolaryngology in 1940.

Dr. Sarno established the practice of his medical specialty in Johnstown, New York, in 1936. He was associated with Johnstown Hospital, and was honorary member of the staff at Nathan Littauer Hospital in Gloversville, New York, and

on the staff of St. Mary's Hospital and Amsterdam City Hospital, both in Amsterdam, New York.

Dr. Sarno was a Fellow of the American Academy of Ophthalmology and Otolaryngology and held membership in the American Medical Association. He was past president of the Fourth District Branch of the Eye, Ear, Nose and Throat Association of New York.

Dr. Sarno died on November 6, 1960, in Johnstown. He is survived by his wife, Jessie B. Sarno, a son and a daughter.

HARRY THEODORE SCHIEFELBEIN

Harry Theodore Schiefelbein was born in New Lisbon, Wisconsin, on July 19, 1897. He received the degree of Doctor of Medicine from the Medical College of Virginia in Richmond in 1923. After an internship at Bellevue Hospital, New York City, he completed a postgraduate residency in ophthalmology at the New York Eye and Ear Infirmary. He was also a graduate in pharmacy. Dr. Schiefelbein was certificated by the American Board of Ophthalmology in 1930.

Dr. Schiefelbein engaged in the private practice of his specialty in Welch, West Virginia, where he was associated with the Stevens Clinic Hospital. He was also consultant in ophthalmology to Bluefield Sanitorium, Bluefield, West Virginia.

Dr. Schiefelbein died on August 17, 1960, aged 63 years.

HENRY EDWARD SCHLEGEL, JR.

Henry Edward Schlegel, Jr., was born in Spokane, Washington, on October 18, 1912. After graduation from the University of Idaho, he entered Rush Medical College of the University of Chicago, from which he received the degree of Doctor of Medicine in 1942.

From 1942 through 1946, Dr. Schlegel served as a Captain in the Army of the United States. He was awarded both the Bronze and the Silver Star for action in World War II.

In 1954, Dr. Schlegel completed a residency in ophthalmology at the University of Oregon Medical School, and was certificated by the American Board of Ophthalmology in 1955.

Dr. Schlegel established a practice in his specialty in Oregon City, Oregon, where he served on the staff of Oregon City Hospital. He was also associated with the Physicians and Surgeons Hospital in Portland and was clinical associate in ophthalmology at the University of Oregon Medical School in Portland.

Dr. Schlegel died in Oregon City on October 16, 1960, at the age of 47 years.

HARRY RAYMOND SECOY

Harry Raymond Secoy was born on November 21, 1890. He attended Iowa State University Medical School, receiving his degree of Doctor of Medicine in 1917. He was certificated by the American Board of Otolaryngology in 1931.

Dr. Secoy served in the United States Army from 1918 to 1920. After his Army service he began the practice of medicine in Everett, Washington. He was associated with Providence Hospital and Everett General Hospital, and was on the staff of the Everett Clinic. He also served as examiner in the Bureau of Air Commerce, United States Department of Commerce.

Dr. Secoy was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology and held membership in the Pacific Coast Oto-Ophthalmological Society, the World Medical Association, the American Medical Association, and state and local medical and specialty societies.

Dr. Secoy died on December 13, 1960, in Everett, Washington. He is survived by his wife and two sons, both of whom are in the medical profession.

MAURICE ARTHUR SHER

Maurice Arthur Sher was born on July 15, 1898, in New York City. He attended New York University, receiving his de-

gree of Doctor of Medicine in 1921, and interned at St. Michael's Hospital in Newark, New Jersey. He did postgraduate study in Vienna in 1928. Dr. Sher was certificated by the American Board of Otolaryngology in 1936.

Dr. Sher began the practice of medicine in Brooklyn, New York, in 1922. He was associated with the Bellevue Medical College, department of rhinolaryngology from 1922 to 1926, and the New York Postgraduate Hospital from 1923 to 1928. He was director of the department of otolaryngology at Coney Island Hospital and associated with Harbor Hospital, and Maimonides Hospital, Israel Zion Division. Dr. Sher specialized in bronchoscopy and plastic surgery.

Dr. Sher was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and of the International College of Surgeons. He also held membership in the American Medical Association and state and local medical societies.

Dr. Sher died on September 14, 1960, in Brooklyn. He is survived by his wife, Dr. Frances Kardons.

JAMES JACOB SIMKINS

James Jacob Simkins was born in the Ukraine on October 10, 1889. He received the degree of Doctor of Medicine from Maryland Medical College, Baltimore, in 1913.

Dr. Simkins began practice as a general practitioner, but soon began to pay special attention to otolaryngology. After 1922 his practice was devoted exclusively to that field. While practicing in Philadelphia, he had been associated with St. Luke's Hospital, Children's Hospital, and Philadelphia General Hospital. At one time he was examining physician for the state boxing commission.

In 1937 Dr. Simkins was certificated by the American Board of Otolaryngology.

Dr. Simkins was a Fellow of the American Academy of Ophthalmology and Otolaryngology and of the International College of Surgeons. He also held membership in the American Medical Association and in state and local medical societies.

Dr. Simkins died in Philadelphia on July 2, 1960, aged 70 years.

WALTER KNAPP SLACK

Walter Knapp Slack was born on February 9, 1899, in Saginaw, Michigan. He attended Williams College and the University of Virginia at Charlottesville, receiving his degree of Doctor of Medicine in 1927. After interning at the University of Michigan Hospital in Ann Arbor, Dr. Slack spent six months in Vienna and London in 1929 continuing his postgraduate study of otolaryngology. Dr. Slack was certificated by the American Board of Otolaryngology in 1934.

Dr. Slack established his practice of medicine in Saginaw, Michigan, in 1929. He was on the senior staff and head of the department at St. Mary's Hospital, where he was formerly chief of staff. He was consultant at Saginaw General Hospital, and since 1950 he served on the attending staff of the Veteran's Administration Hospital.

Dr. Slack was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and a fellow of the American College of Surgeons. He held membership in the American Medical Association and state and local medical societies.

Dr. Slack died on November 13, 1960, in Saginaw. He is survived by his wife, Lenore Spero Slack, a daughter and two sons, one of whom, Dr. William Slack of Detroit, is also in the medical profession.

WILLIAM JEWELL SMITH

William Jewell Smith was born on December 13, 1900, in Gainesville, Texas. He attended Northwestern University Medical School in Chicago, receiving his degree of Doctor of Medicine in 1929. Dr. Smith did postgraduate work at the University of Pennsylvania, receiving a degree of Master of Science. He served a residency in ear, nose and throat at the Children's Hospital in Los Angeles from 1933 to 1934, and a residency in ophthalmology there from 1934 to 1935.

Dr. Smith had begun the practice of medicine in 1929, in Morenci, Arizona, but after completing his postgraduate study he established a practice in the specialties of ophthalmology and otolaryngology in Phoenix, Arizona. He was associated with the Good Samaritan Hospital and St. Joseph's Hospital. In 1942 he left Phoenix, becoming a member of the United States Naval Medical Corps. He held the rank of lieutenant commander and was assigned to the U. S. Naval Hospital at San Diego, California. After his discharge from the Navy he established a practice at Fresno, California, where he was associated with St. Agnes Hospital, the General Hospital and Community Hospital. He was president of the medical and surgical staff of the latter institution in 1956.

Dr. Smith died on September 12, 1960, in Fresno. He is survived by his wife and a daughter.

LANSFORD MONROE SPALDING

Lansford Monroe Spalding was born on October 29, 1892, in Olean, Missouri. He attended Westminster College in Fulton, Missouri, and the National University of Arts and Sciences Medical Department at St. Louis, receiving his degree of Doctor of Medicine in 1913. After interning at St. Vincent's Hospital in Portland, Oregon, Dr. Spalding took a year of postgraduate work at Stanford University in 1915. Dr. Spalding engaged in further postgraduate work in otolaryngology at the University of Chicago and at the University of Illinois in 1924 and 1925. He was certificated by the American Board of Otolaryngology in 1927. Dr. Spalding was a veteran of World War I.

Dr. Spalding began his medical career as a consulting specialist for the United States Public Health Service and later established his practice in Astoria, Oregon. He was on the executive staff of St. Mary's Hospital and on the staff of Columbia Hospital in Astoria. He also served on the Staff of St. Anthony's Hospital in Pendleton, Oregon.

Dr. Spalding was a Fellow of the American Academy of Ophthalmology and Otolaryngology. He was past president of the Oregon State Medical Society and held membership in the Pacific Coast Oto-Ophthalmological Society, and the American Medical Association.

Dr. Spalding died on August 27, 1960, in Astoria. He is survived by his wife, Jean Spalding.

EDWARD STEIN

Edward Stein was born on May 16, 1915, in Detroit, Michigan. He attended Wayne University, receiving his Bachelor of Arts degree, and the University of Michigan Medical School, receiving his degree of Doctor of Medicine in 1938. From 1938 through 1941, he interned and served a residency in ophthalmology and otolaryngology at Wayne County General Hospital. From 1941 to 1945, he served as Flight Surgeon in the Medical Corps of the United States Air Force.

Dr. Stein began the practice of medicine in 1945 in Detroit. He was associated with Detroit Receiving Hospital, Sinai Hospital and Children's Hospital. Dr. Stein was certificated in 1956, by the American Board of Ophthalmology.

Dr. Stein was a Fellow of the American Academy of Ophthalmology and Otolaryngology. He also held membership in the Detroit Surgical Society, the American Medical Association, Oakland County Medical Society, Wayne County Medical Society, and Michigan State Medical Society.

Dr. Stein died on July 18, 1960, in Detroit. He is survived by his wife.

LEIGH F. STURGES

Dr. Leigh F. Sturges, a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, died in Manhasset, L. I., New York, on February 27, 1959, at the age of 85 years.

Dr. Sturges had been a Fellow of the Academy since 1918. For many years he conducted a practice in otolaryngology in New York City, but retired to Manhasset in 1951.

EDWARD CHILES SWEEBE

Edward Chiles Sweebe was born in Waukegan, Illinois, on September 4, 1929. After receiving the degree of Bachelor of Arts from George Washington University in Washington, D. C., in 1951, he entered the School of Medicine of that institution and received his degree as Doctor of Medicine in 1954.

After an internship at Receiving Hospital in Detroit, Dr. Sweebe took a year's residency at Kresge Eye Institute. Since that time he has been associated with Massachusetts Eye and Ear Infirmary, Boston, first as a Fellow in Ophthalmology, and later as assistant engaged primarily in ophthalmic research in diseases of the cornea and keratoplasty. He was appointed Teaching Fellow in Ophthalmology by Harvard Medical School on July 1, 1960, and just prior to his death on May 9, 1961, he had been appointed director of the Eye Bank at the Massachusetts Eye and Ear Infirmary.

Dr. Sweebe was certificated by the American Board of Ophthalmology in 1960.

Dr. Sweebe was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and was a member of the New England Ophthalmological Society, the American Medical Association, and state and local medical societies.

Surviving Dr. Sweebe are his wife, Barbara, and one son.

THOMAS WILSON THOBURN

Thomas Wilson Thoburn was born in Winfield, Kansas, on February 12, 1890. He received the degree of Doctor of Medicine from Western Reserve University School of Medicine, Cleveland, in 1918. After an internship at St. Luke's Hospital in Cleveland, he completed a residency in otolaryngology at Eye and Ear Hospital, Pittsburgh. Other postgraduate work was done at Manhattan Eye, Ear and Throat Hospital, New York, and in Vienna, Austria. Dr. Thoburn was certificated by the American Board of Otolaryngology in 1938.

Dr. Thoburn's professional career began in Cleveland in 1920 and continued there until his death on February 2, 1961. From 1943 to 1955 he had been head of the department of otolaryngology at St. Luke's Hospital.

Dr. Thoburn was a Fellow of the American Academy of Ophthalmology and Otolaryngology and of the American College of Surgeons. He also held membership in the American Laryngological, Rhinological, Otological Society, the American Otorhinologic Society for Plastic Surgery, the American Medical Association, and state and local medical societies.

Dr. Thoburn is survived by his wife, Annie Bishop Thoburn, a daughter, and two sons.

EDWARD HENRY THOMPSON

Edward Henry Thompson was born on October 22, 1876, at Franklin, Ohio. He attended Ohio Medical College (now the University of Cincinnati College of Medicine), receiving his degree of Doctor of Medicine in 1899. Dr. Thompson interned at Cincinnati General Hospital.

Dr. Thompson began the practice of medicine in Cincinnati in 1899 as an associate of Dr. Christian R. Holmes, an eye specialist. Dr. Thompson was on the staff of the Good Samaritan Hospital.

Dr. Thompson was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and held membership in state and local medical societies.

Outside of his medical practice Dr. Thompson was interested in antiques, guns and other small arms, and, particularly, photography. His interest in photography motivated the establishment of the International Film Company. This company made newsreels, cartoons and documentary films. It was eventually absorbed by Pathe Newsreels.

Dr. Thompson died on October 17, 1960, in Cincinnati. He had been active in the medical profession for 61 years. He is survived by his wife, Madge Thiel Thompson, a son and a daughter.

JOHN MALCOLM TINDAL

John Malcolm Tindal was born in 1896 in Indianapolis, Indiana. He attended Indiana University, where he received his Bachelor of Science degree and his degree of Doctor of Medicine from the Indiana University School of Medicine in 1929. Dr. Tindal served a rotating internship from 1929 to 1930 at Methodist Episcopal Hospital in Indianapolis. From 1930 to 1932 he did postgraduate study in the field of otorhinolaryngology at the University of Chicago and Rush University, and in ophthalmology at Rush University and the University of Illinois. Dr. Tindal was certificated by the American Board of Otolaryngology in 1933 and by the American Board of Ophthalmology in 1934.

Dr. Tindal established a practice in his specialties in Chicago. He was associated with St. Luke's Hospital, Ball Memorial Hospital, and was on the staff of the Illinois Eye and Ear Infirmary.

Dr. Tindal was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology and also held membership in the American Medical Association.

Dr. Tindal died on October 20, 1960, in Chicago. He is survived by his wife, Esther Tindal, and a daughter, Mrs. Virginia Russo.

FREDERICK MYLES TURNBULL

Frederick Myles Turnbull was born on March 19, 1885, in Bear River, Nova Scotia, Canada. He attended McGill University Faculty of Medicine in Montreal, receiving his degree of Doctor of Medicine in 1909. Dr. Turnbull did specialty training in ophthalmology and otolaryngology at New York Postgraduate Medical School Hospital from 1909 to 1912. He was certificated by the American Board of Otolaryngology in 1931.

Dr. Turnbull began the practice of otolaryngology in Duluth, Minnesota, in 1912, were he was associated with St. Luke's Hospital. He moved to Los Angeles in 1927, where he was on the staff of Good Samaritan Hospital and Cedars of Lebanon Hospital.

Dr. Turnbull specialized in disorders which involved the sinuses, and in 1929 he described an antroethmosphenoidal approach for the surgical management of chronic pansinusitis. The development of instruments and medications for the medical and surgical treatment of nasal and sinus pathology were of especial interest to him.

Dr. Turnbull was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and a fellow of the International College of Surgeons. He held membership in the Pacific Coast Oto-Ophthalmological Society, the Public Health League of California, the American Medical Association, and state and local medical societies. He was formerly director of the Los Angeles County Physicians Aid Association.

Dr. Turnbull died on January 13, 1961, in Los Angeles. He is survived by his wife, Evelyn Turnbull, and a son, Frederick M. Turnbull, Jr., also an otolaryngologist and a member of the Academy.

PAUL ROBERT URMSTON

Paul Robert Urmston was born on January 7, 1880, in Hamilton, Ohio. He attended the College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois (now University of Illinois College of Medicine), receiving his degree of Doctor of Medicine in 1903. Dr. Urmston was certificated by the American Board of Otolaryngology in 1939.

Dr. Urmston established his practice of medicine in Bay City, Michigan, in 1903. After 1907 he limited his practice to the specialties of ophthalmology and otolaryngology. He was associated with the staffs of Mercy Hospital and Bay City General Hospital.

Dr. Urmston was a Fellow of the American Academy of Ophthalmology and Otolaryngology and held membership in the American Medical Association. He was past president of the Michigan State Medical Society, and of the Bay County Medical Society.

Dr. Urmston died on August 24, 1960, in Bay City, Michigan. He is survived by a daughter, Mrs. Betty Mickey.

CLARENCE ARCHIBALD VEASEY, JR.

Clarence Archibald Veasey was born on November 24, 1895, in Philadelphia, Pennsylvania. He attended Yale University and the University of Pennsylvania School of Medicine, receiving his degree of Doctor of Medicine in 1920. Dr. Veasey interned at the Philadelphia Polyclinic and the Presbyterian Hospital from 1919 to 1920 and served a residency at the New York Eye and Ear Infirmary from 1921 to 1924. He was certificated by the American Board of Ophthalmology in 1926, and in the same year by the American Board of Otolaryngology.

Dr. Veasey began the practice of medicine in Spokane, Washington, in 1924. He was aurist and oculist at the Deaconess Hospital, St. Luke's Hospital, and the Sacred Heart Hospital.

Dr. Veasey was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology and a fellow of the American College of Surgeons. He also held membership in the American Ophthalmological Society, the Pacific Coast Oto-Ophthalmological Society, the American Medical Association and state and local medical societies. Dr. Veasey was a past president of the Washington State Medical Service Bureau and of the Spokane Medical Bureau.

Dr. Veasey liked to paint and sail during his leisure hours. He was also musically talented and composed choral music for the St. Luke's choir. A major undertaking was his arrangement of Wagner's "Parsifal" for mixed chorus with orchestration for ten strings and organ.

Dr. Veasey died on August 22, 1960, in Spokane, Washington. He is survived by his wife, Beryl Veasey, a son and a daughter.

HENRY PATRICK WAGENER

Henry Patrick Wagener was born on June 3, 1890, in Charleston, South Carolina. He attended the College of Charleston, receiving the degree of Bachelor of Science in 1909, and the Medical College of South Carolina, receiving the degree of Doctor of Medicine in 1913. After receiving his medical degree Dr. Wagener served as an assistant to a physician in Charleston, remaining there until 1917, when he left Charleston to attend the University of Minnesota Medical School as a fellow in ophthalmology. His medical studies were briefly interrupted when he served in the United States Army Medical Corps from 1918 to 1920, holding the rank of first lieutenant. Returning to civilian life, Dr. Wagener entered the Mayo Foundation, Graduate School of Medicine of the University of Minnesota as a fellow in ophthalmology. He received the degree of Master of Science in ophthalmology in 1923, and was certificated by the American Board of Ophthalmology in 1926.

Dr. Wagener was an instructor in ophthalmology in the Mayo Foundation from 1924 to 1927. He was appointed as a consultant on the staff in the section of ophthalmology in 1926. From 1927 to 1933 he was assistant professor; associate professor from 1933 to 1947, and professor from 1947 until his retirement in 1955. He was associated with the hospitals affiliated with the Mayo Clinic.

Of particular interest to Dr. Wagener were ocular lesions associated with hypertensive cardiovascular disease, diabetes mellitus, and diseases of the central nervous system. After his retirement he devoted his time to writing and research in this field.

Dr. Wagener was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and held membership in the American Ophthalmological Society, the Societe Francaise d'Ophtalmologie, the Medical Society of South Carolina, the Southern Medical Association, the American Medical Association, the Alumni Association of the Mayo Foundation, the Society of Sigma Xi, and the Minnesota Academy of Ophthalmology and Otolaryngology.

Dr. Wagener died on April 27, 1961, in Rochester, Minnesota, after a brief illness. He is survived by his wife, Sabina Waterfield Wagener, and two daughters.

ROBERT FRANCIS WELCH

Robert Francis Welch was born on November 15, 1904, in Brockton, Massachusetts. He attended Boston College and

then Harvard University School of Medicine, receiving the degree of Doctor of Medicine in 1932. Dr. Welch served an internship in pediatrics at the Boston City Hospital from 1932 to 1933. From 1933 to 1935 he interned at the Massachusetts Eye and Ear Infirmary. Dr. Welch continued his postgraduate studies at the University of Cincinnati and Gill Memorial Hospital. He was certificated by the American Board of Otolaryngology in 1945.

Dr. Welch began the practice of medicine in 1935 in Brockton, Massachusetts. He was associated with Brockton Hospital and was a surgeon on the visiting staff at Boston City Hospital.

Dr. Welch was a Fellow of the American Academy of Ophthalmology and Otolaryngology. He also held membership in the New England Otolaryngological Society, the American Medical Association and state and local medical societies.

Dr. Welch died on December 12, 1960, in Brockton. He is survived by his wife, Frances Emiline Flynn Welch, two daughters and two sons.

WILLIAM WESLEY WILKERSON, JR.

William Wesley Wilkerson, Jr., was born in Nashville, Tennessee, on November 11, 1897. He received the degree of Doctor of Medicine from Vanderbilt University School of Medicine, Nashville, in 1920. A postgraduate residency in ophthalmology and otolaryngology at Bellevue Hospital, New York City, was completed in 1924. Dr. Wilkerson was certificated by the American Board of Otolaryngology in 1928.

Dr. Wilkerson's entire professional career was spent in his native city, where he was a member of the staffs of St. Thomas Hospital, Baptist Hospital, and the Junior League Home for Crippled Children. He served as chief of the otolaryngology department at Nashville General Hospital and was a consultant to the Veterans Administration Hospital.

Dr. Wilkerson was also assistant professor of clinical otolaryngology at his alma mater. He was founder and chairman of the board of the Bill Wilkerson Hearing and Speech Center, of which he was medical director from its founding in 1951 through 1958. The Center was named for his son who was killed in Army service in Belgium in 1945. It will be a lasting memorial to his interest and hard work.

A Life Fellow of the American Academy of Ophthalmology and Otolaryngology, Dr. Wilkerson was also a fellow of the American College of Surgeons. He held membership in the American Laryngological Association and the American Laryngological, Rhinological, Otological Society, and he was a past president of the Tennessee Academy of Ophthalmology and Otolaryngology and of the Nashville Academy of Medicine. He was founder of the Nashville Postgraduate Assembly, of which he was past chairman. He also held membership in the American Medical Association, the Southern Medical Association, and state and local medical societies.

Dr. Wilkerson died in his native city on March 14, 1961. He is survived by his wife, Fawn Parent Wilkerson, and by two daughters.

SAMUEL HENRY WILKINS

Dr. Samuel Henry Wilkins, a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, died on February 2, 1961, in Medford, Massachusetts. He was 79 years old.

Samuel Henry Wilkins was born on February 4, 1881, in Cambridge, Massachusetts. He attended Dartmouth College, receiving the degree of Bachelor of Arts in 1905, and Harvard University School of Medicine, receiving the degree of Medicine in 1908. Dr. Wilkins interned at Lawrence General Hospital in Medford, Massachusetts, in 1908 and 1909. He was certificated by the American Board of Ophthalmology in 1924.

Dr. Wilkins began the practice of medicine as a general practitioner in 1910 in Somerville and Medford, suburbs of Boston. In 1916 he entered Harvard University Postgraduate School to continue his medical studies in the field of ophthalmology. From 1919 to 1925 he was visiting ophthalmologist at the Brookline Friend-

ly Society. He served on the staff of Boston City Hospital from 1920 to 1928, and on the ophthalmic staff of the Massachusetts Eye and Ear Infirmary since 1921, serving as consulting surgeon since 1941. Dr. Wilkins had been on the staff of Lawrence General Hospital since 1925, refractionist at the Long Island Hospital in Boston since 1927, and associated with the out-patient department of Newton-Wellesley Hospital from 1931 to his retirement. He was a former instructor of ophthalmology at Tufts Medical School from 1925 to 1940.

Dr. Wilkins was a fellow of the American College of Surgeons and held membership in the New England Ophthalmological Society and the American Medical Association.

Outside of his medical practice, Dr. Wilkins was active in various cultural organizations. Of particular interest to him were dramatics, painting and sketching, poetry and music composition, all of which he enjoyed actively.

Dr. Wilkins is survived by his wife, Mary Stone Piper Wilkins, and a daughter, Mrs. Anne Parker.

HENRY G. WINCOR

Henry G. Wincor was born in 1886 in Russia. He received his degree of Doctor of Medicine in 1908 from the Long Island College Hospital. Dr. Wincor interned at Brooklyn Hospital from 1908 to 1909. He was certificated by the American Board of Ophthalmology in 1928.

Dr. Wincor was consulting director of ophthalmology at the Bronx Hospital, attending ophthalmologist, director and chief of the clinic at Fordham Hospital, and consulting ophthalmologist at the Home for Aged and Sick Hebrews, and at the Home for Aged and Infirm Hebrews.

Dr. Wincor was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and a fellow of the American College of Surgeons. He also held membership in the American Medical Association.

Dr. Wincor died on July 17, 1960, in New York City.

DAVID RAY WOMACK

David Ray Womack was born in Rockwall, Texas, in April, 1902. He attended Tulane University of Louisiana, School of Medicine, receiving his degree of Doctor of Medicine in 1927. Dr. Womack interned in New Orleans at Touro Infirmary and was a resident at the Eye, Ear, Nose and Throat Hospital. He was certificated by the American Board of Otolaryngology in 1932.

Dr. Womack practiced his specialty in New Orleans from 1932 to 1940, where he was associated with Touro Infirmary, and the Eye, Ear, Nose and Throat Hospital. He later became associated with the Veterans Administration.

Dr. Womack served as a commander in the United States Navy during World War II. He was stationed for a while at Fort Pierce in Florida, where he was attached to the Amphibian Training Base. Later, he served aboard the USS Blackhawk in the Pacific Fleet, and from 1941 to 1945 was at the Pensacola Naval Hospital.

Dr. Womack was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology. He also held membership in the American Broncho-Esophagological Association, the American College of Chest Physicians, the Association of Military Surgeons of the United States, the Southern Medical Association and the American Medical Association.

Dr. Womack died on August 26, 1960, in Austin, Texas. He is survived by his wife, Amoret Gates Womack, and two sons.

BOOK REVIEWS

HEREDITY IN OPHTHALMOLOGY. By Jules François, Ghent, Belgium. Translated from the French edition entitled *L'Hérédité en ophthalmologie.* St. Louis, C. V. Mosby, 1961. Board, cloth. 705 pp. Author index and subject index. 629 il. (6 in color.) $23.00.

Hereditary disorders and diseases of the eye are seen in some form in the majority of families and have been recorded in scientific journals in increasing numbers as new syndromes are discovered and more intensive study of the factors that are involved become better known and utilized.

Advances in the sciences of heredity, environment and genetics are far beyond the scope of the busy practitioner. To aid in understanding the classification of hereditary diseases of the eye, the author has devoted the opening chapters of his book to a discussion of general genetics, beginning with fertilization, cell division and essential concepts of genetics. While chromosome matching is a complicated mechanism, the author has demonstrated by use of diagrams and tables the possible combinations of chromosomes and genes, and has discussed the theories of transmission of characteristics that make up the clinical manifestations recognized by the physician as hereditary in origin.

In Part II the author narrows the discussion to Genetics in Ophthalmology. Part III is concerned with the Hereditary Diseases of the Eye. Part IV discusses General Diseases with Ocular Manifestations. Every part of the book is replete with personal observations of the author besides a wide review of the literature. Extensive bibliographic references are included, covering nearly every condition described.

The book should be in every medical library.

W.L.B.

OPTIK DES MENSCHLICHEN AUGES: THEORIE UND PRAXIS DER REFRAKTIONSBESTIMMUNG (OPTICS OF THE HUMAN EYE: THEORY AND PRACTICE OF REFRACTION) by Robert Siebeck (Chief Physician of the Eye Clinic of the Erlangen University). Berlin, Springer-Verlag; 1960. 269 pp.; 157 il. Price DM 46.80 (about $11.00).

"Motility and Refraction" by Dr. Walter Lancaster, published in 1951, served as the stimulus for this book; but the scope has been expanded very greatly to include much of physical optics and considerable physiologic optics. Actually, this is not a treatise on refraction of the eye for the clinician, but rather a quite complete presentation of the theoretical principles for determining the refraction of the eye and the properties of ophthalmic lenses. Those readers who are familiar with German will find this book well planned, exceptionally well illustrated, and concise. It treats of a large number of optical matters—some rather too concisely—and of some not directly concerned with ophthalmology. With the capable assistance of others, Dr. Siebeck has included some mathematical treatments where the subject calls for it (which Dr. Lancaster did not); but he has kept them in simplest terms.

The greater part of the first 50 pages of the book is devoted to physical optics and the nature of light, with considerable space given to the wave theory of light and interference phenomena. The discussion of refraction of light and the nature of the caustic surfaces in image formation is well handled without the use of mathematics. This is preliminary to the description of the double-cusp caustic surface Gullstrand found for the human eye. The presentation of ray tracing through spherical surfaces for the radial and tangential refracted rays is the most difficult part of the book for the ophthalmologist, since the mathematics necessary is more rigorous. The discussion of the effect of apertures upon image formation and perspective imagery in general is good and is well-illustrated. Different types of optical systems then are discussed, leading up to the dioptric system of the eye. The author uses the Gullstrand schematic eye (with the core lens) in both the relaxed and maximally accommodated states.

The second half of the book is concerned with ophthalmic-lens optics, corrective lenses, and the ametropic eye, following a somewhat familiar outline. The use of the Jackson cross-cylinder method is well described and illustrated, but the astigmatic dial test using the Raubitschek target is also included, as is a short section on the stigmatoscopy method. More general topics are briefly discussed, such as corrective lenses and eye movements, ophthalmic prisms, aniseikonia (much too briefly), lenses for subnormal vision, the magnifying effect of ophthalmic lenses, and so forth. The last part of the book is given to the description of various instruments used in ophthalmology.

For the ophthalmologist who can read German this book offers much, in a concise style, of the theoretical principles necessary for adequate understanding of the optics of the eye.

K.N.O.

A SYNOPSIS OF OPHTHALMOLOGY. By J. L. C. Martin-Doyle, M. R. C. S. (Eng.), L. R. C. P. (Lond.), D. O. (Oxon.) ed. 2. (Ed. 1, 1951.) Bristol, England, John Wright and Sons, Ltd., 1961. Distributed by Williams and Wilkins Co, Baltimore. Board. Pocket size (5″x7¼″), 236 pp., Index. $6.50.

This is a comprehensive synopsis of ophthalmology designed for "service to the medical student, the general practitioner and the post-graduate about to take a diploma in ophthalmology."

Contents are divided into twenty-four chapters covering external diseases of the eye, diseases of the uvea, lens, retina, optic nerve and the vitreous; optical anomalies of the eye, anomalies of ocular movement and subjective visual disturbances. Special features are included, such as contact lenses, ophthalmic operations, corticosteroids and allergy.

A wide grasp of current ophthalmology possessed by the author is documented here for quick referral. There is a little bit about everything but not much about anything — but enough to make it a very useful book on the desk of every practitioner of medicine.

W.L.B.

NEWS AND ANNOUNCEMENTS

DELTA GAMMA FOUNDATION

The Delta Gamma Foundation offers scholarships for the training of orthoptic technicians, teachers and consultants for visually handicapped children. The deadline for application is April 1, 1962. For further information please write Delta Gamma Central Office, 3250 Riverside Drive, Columbus 21, Ohio.

SCHOLARSHIP FUND

The Zenith Radio Corporation, for the third consecutive year, has presented a gift of $1,500.00 to the American Speech and Hearing Association Foundation scholarship fund. The funds are disbursed through the American Speech and Hearing Association Foundation. Last year the Zenith Radio Corporation portion of the scholarship fund was shared by three students attending Johns Hopkins University, the University of Minnesota and the University of Pittsburgh, respectively.

NATIONAL INSTITUTES OF HEALTH

Associate Director of Extramural Research

Dr. John F. Sherman has been appointed associate director for Extramural Research for the National Institute of Neurological Diseases and Blindness.

The appointment of Dr. Sherman, who since 1958 has been deputy chief of Extramural Programs for the National Institute of Arthritis and Metabolic Diseases, was announced by Surgeon General Luther L. Terry of the Public Health Service, U. S. Department of Health, Education and Welfare.

Both NINDB and NIAMD are among the seven institutes that make up the National Institutes of Health, the research arm of the Public Health Service at Bethesda, Maryland.

As NINDB associate director in charge of Extramural Research, Dr. Sherman will be responsible for the research and training grant programs of the Institute. He also will serve in a major advisory role to NINDB Director, Dr. Richard L. Masland, on the Institute's total program.

Dr. Sherman came to the National Institutes of Health in 1953 as a research pharmacologist in the Laboratory of Tropical Diseases, National Institute of Allergy and Infectious Diseases. In 1956 he was appointed assistant to the chief of Extramural Programs for the National Institute of Arthritis and Metabolic Diseases and the following year was promoted to assistant chief. In 1958 he became deputy chief of NIAMD Extramural Programs.

A native of Oneonta, New York, Dr. Sherman received a B. S. degree from the Union University College of Pharmacy, Albany. He was awarded a Ph.D. degree in 1953 from Yale University. He is the author and co-author of numerous articles on pharmacology appearing in medical and scientific journals and encyclopedias.

Research Program Coordinator for Vision

Dr. Marie A. Jakus, formerly of the Retina Foundation, has been appointed research program coordinator for vision in the Extramural Programs Branch, National Institute of Neurological Diseases and Blindness, National Institutes of Health.

In the new post, she will be responsible for coordinating the Institute's research grants program in the field of vision and will serve in a major advisory role.

For the past ten years, Doctor Jakus has been associated with the Retina Foundation, Boston, where she conducted research on the fine structure of ocular tissues. A native of Cleveland, Ohio, she received her Ph.D. degree from the Massachusetts Institute of Technology in 1945.

NATIONAL COUNCIL TO COMBAT BLINDNESS, INC.

The National Council to Combat Blindness, Inc.—THE FIGHT FOR SIGHT—announces that the closing date for receipt of completed applications for full-time research fellowships, grants-in-aid and student fellowships for the 1962-63 period is March 1, 1962.

In general, notification to applicants for full-time research fellowships and grants-in-aid will go forward in July with September 1 as the commencement date for the project. Under special circumstances, where earlier notification is judged essential, the Scientific Advisory Committee may consider applications in advance of the scheduled date, but in no event will they be considered for commencement prior to May 1.

Applicants for student fellowships will be notified in May of the action taken by the Scientific Advisory Committee in order that arrangements may be made with their respective institutions to commence work in early summer.

Application forms and information outlining the conditions under which these awards are made may be obtained by addressing Secretary, National Council to Combat Blindness, Inc., 41 West 57th Street, New York 19, N. Y.

ANNOUNCEMENT

Dr. John W. Henderson has been promoted to Head of the Section of Ophthalmology in the Mayo Clinic, Rochester, Minnesota, succeeding Dr. C. Wilbur Rucker who will now become a senior consultant.

EMORY UNIVERSITY

A postgraduate course in ophthalmology will be presented November 30 and December 1, 1961, at the Grady Memorial Hospital, Atlanta, Georgia, under the sponsorship of the Department of Ophthalmology, Emory University School of Medicine.

The course is designed for the practicing clinical ophthalmologist and will consist of lectures and panel discussions by outstanding national authorities on a wide variety of disorders of the posterior segment of the eye. Methods of examination, clinical manifestations, differential diagnosis and pathologic anatomy of many of the lesions of the vitreous, uvea, retina and optic nerve which are encountered in daily practice will be presented in detail.

The guest lecturers for the 1961 course will be Dr. Algernon B. Reese, Columbia University, New York; Dr. Charles L. Schepens, Harvard Medical School, Boston, and Dr. Lorenz E. Zimmerman, Armed Forces Institute of Pathology, Washington, D. C.

FOURTH INTERNATIONAL CONGRESS OF ALLERGOLOGY

The Fourth International Congress of Allergology was held at the Commodore Hotel, New York, October 15 to 20, 1961. Experts from the United States, Europe, South America, Asia, Africa, Australia and the Middle East took part in the five-day program. Included among the speakers were Dr. Justin M. Andrews, Bethesda, Md.; Dr. Francis B. Rackemann, Boston; Professor Pasteur Vallery-Radot, Paris; Dr. William B. Sherman, New York, and Dr. Bernard N. Halpern, Paris.

INTERNATIONAL MEDICAL CONGRESS, LTD.

The First Inter-American Conference on Congenital Defects will be held at the Statler Hotel, Los Angeles, California, January 22 to 24, 1962. Co-sponsors will be The National Foundation and The University of Southern California. The general chairman of the meeting will be Dr. Norman H. Topping, President, University of Southern California. Among the topics listed for discussion are Eye Defects and Eye Anomalies. For further information concerning this conference please write Mr. Stanley E. Henwood, Executive Secretary, International Medical Congress, Ltd., 120 Broadway, Room 3013, New York 5.

SOUTHERN MEDICAL ASSOCIATION

The Section on Ophthalmology and Otolaryngology of the Southern Medical Association will meet in Dallas, Texas, November 6 to 9, 1961.

The program will feature television surgical clinics on Glaucoma and Laryngectomy. Papers and symposiums on Corneal Diseases, Contact Lens, Retinal Detachment, Tympanoplasty, Otitis Media, Tonsillar Techniques, and other subjects will be presented. Dr. Trygve Gundersen of Boston, Massachusetts, will be the guest speaker.

For additional information please contact the secretary, Dr. Albert C. Esposito, First Huntington National Bank Building, Huntington, West Virginia.

NEW ORLEANS ACADEMY OF OPHTHALMOLOGY

The New Orleans Academy of Ophthalmology will hold its mid-winter convention February 19 to 23, 1962. A symposium on Infectious Diseases of the Conjunctiva and Cornea will be held.

Members of the symposium will include Henry F. Allen, M.D.; Robert Burns, M.D.; Isadore Givner, M.D.; Samuel N. Key, M.D.; Samuel J. Kimura, M.D., and Phillips Thygeson, M.D.

For further information please write to the Executive Secretary, New Orleans Academy of Ophthalmology, P.O. Box 469, New Orleans 1, Louisiana.

AMERICAN SOCIETY OF FACIAL PLASTIC SURGERY

The American Society of Facial Plastic Surgery held a brief business meeting, including nomination of officers, in their Hospitality Suite at the Palmer House on Wednesday, October 11.

The next meeting of the Society will be held on January 19, 1962, at the Hotel Elysee in New York, during the course in Rhinoplasty by Dr. Irving B. Goldman. (The course will be given at The Mount Sinai Hospital from January 13 to 26, 1962.)

The long-awaited meeting in New Orleans will be held from March 3 through March 5, 1962. Members should arrive at The Roosevelt Hotel on March 2 and plan to stay through Mardi Gras on March 6. Dr. L. J. Rutledge has planned an excellent and instructive program.

WORLD FEDERATION OF NEUROLOGY

The founding meeting of the Problem Commission of Neuro-ophthalmology was held at the University Neuro-ophthalmological Clinic of the Hospital Cantonal, Geneva, March 18 and 19, 1961.

The founding members are Dr. Ludo van Bogaert, President, Antwerp; W. R. Finks, Executive Officer, New York; Dr. M. Callens, Medical Officer, Antwerp; Dr. G. B. Bietti, Rome; Dr. P. Bregeat, Paris; Dr. P. Danis, Brussels; Dr. A. Franceschetti, Geneva; Dr. J. Francois, Ghent; Dr. P. Guillot, Marseilles; Dr. H. Ikui, Fukoka; Dr. P. Kissel, Nancy; Dr. F. W. Newell, Chicago; Dr. G. Offret, Paris; Dr. B. Streiff, Lausanne; Dr. C. J. Valdeavellano, Lima, and Dr. C. J. Van Slyke, Washington.

The first aims of the Problem Commission of Neuro-ophthalmology are to stimulate contacts between ophthalmologists and neurologists, and to increase the knowledge of neurological and neuro-ophthalmological diseases. Given this symbiosis of neurology and ophthalmology, the Problem Commission will facilitate the exchange of information and scientific material between the investigators of both disciplines, establish documentation centers, organize symposia, and improve the techniques of the preparation and examination of histologic specimens. Also the Problem Commission desires closer relations with the specialists of other scientific fields, such as neurogenetics and neurochemistry. The Secretariats of this commission will be directed by Prof. A. Franceschetti (Geneva) for the Eastern Hemisphere and by Prof. F. W. Newell (Chicago) for the Western Hemisphere.

The Secretaries will be pleased to furnish further information concerning the organization of the Problem Commission

and to facilitate contacts with other specialists on this discipline.

All inquiries should be addressed to Dr. A. Franceschetti, Clinique Ophthalmologique, 22 Rue Alcide Jentzer, Geneva, Switzerland, or to Dr. F. W. Newell, University of Chicago, 950 East 59th Street, Chicago 37, Illinois.

EVALUATION OF RISK OF INDIVIDUAL OPERATIONS FOR STRABISMUS

The following letter has been received from Prof. MURr. Rudolf Knobloch, M.D., Ophthalmic Clinic, Plzen, Czechoslovakia.

"We would like to evaluate the risk of individual operations in order to correct squinting. As fatal failures in operating strabismus are very rare and not published if occurring, we would be much obliged to you if you could let us know any case of endophthalmitis as resulting from the perforation of bulbus due to deep suture, as well as any death during anesthesia in operating strabismus. The cases may be from other institutes too. We are interested in negative data as well.

"Thanks for your kindness in advance. You may be sure the anonymity of any communicated data will be ensured. We suppose you will be interested in the results of our investigation, so you will be given precise notice concerning the publication resulting from this [inquiry]."

AMERICAN SOCIETY OF ORAL SURGEONS

The First International Conference on Oral Surgery, sponsored by the American Society of Oral Surgeons in conjunction with the Royal College of Surgeons of England, will be held at the Royal College in London, July 1 to 4, 1962. All interested dentists and physicians are invited to attend. The program will include symposia on the temporomandibular joint and on maxillofacial injuries, in addition to a wide variety of scientific papers and discussion. Approximately one half of these papers will be presented by essayists from North, South and Central America and the other half from the United Kingdom, Europe, Africa and Asia. Visitors attending the Conference will also have an opportunity to observe surgical procedures in the hospitals of London.

Extensive social and ladies' programs have been arranged by the Joint British-United States Committee. Features of the social program will be a banquet at London's famed and historic Guildhall and a reception by Her Majesty's Government.

For additional details and bulletins, dentists and physicians in the United Kingdom and Europe should write Dr. Terence Ward, c/o Royal College of Surgeons, Lincoln's Inn Fields, London, W. C. 2. Dentists and physicians in the United States and other countries should write Mr. D. C. Trexler, American Society of Oral Surgeons, 840 North Lake Shore Drive, Chicago, Illinois, U. S. A.

REQUEST FOR INFORMATION

The following letter has been received from John B. Gregg, M.D., Sioux Falls, South Dakota.

"One of the medical students at the University of South Dakota with whom I am working has posed a problem which I have been unable to answer on a local level or through contact with ophthalmologists in this part of the country. He has inquired regarding the histological or chemical changes in the retina of the human eye in a person with either total color blindness or partial color blindness.

"We would like, if possible, to obtain sections of a human eye from a color blind person for study or to obtain such an eye in toto for histological study. Do you know of any possible source for such material? If you cannot supply such information from personal experience, would it be possible to have a small notation inserted into the News and Announcements or other page of the **Transactions** of the Academy.

"Any information which you may be able to supply will be gratefully appreciated."

POSITIONS AVAILABLE

WANTED: E.E.N.T. SPECIALIST to take over established practice of deceased doctor. Completely equipped air-conditioned office. Immediately available. Practice over 30 years old in same town. Population of more than 100,00. For further information write Dr. H. C. Ingram's office, 15 E. Columbia Street, Orlando, Florida.

OPHTHALMOLOGIST WANTED: Extremely active and busy practice of recently deceased ophthalmologist for rent, lease or sale. Records are intact. Very busy surgical practice with unlimited potential. Large city with drawing capacity of 750,000. Fully equipped, air-conditioned office three years old. Central location. No parking problems. For further information please write Mrs. Morris Botvin, 17 Lowden St., Pawtucket, Rhode Island.

WANTED: Florida licensed OPHTHALMOLOGIST. Board eligible. South Florida location. 45,000 population. Unopposed. Send current vita. For further information please write to William R. Ploss, M.D., 638 United Street, P. O. Box 688, Key West, Florida.

Listings of positions available should be sent to W. L. Benedict, M.D., 15 Second Street S. W., Rochester, Minn., by the fifth of the month preceding publication. They should include (1) type of physician wanted (ophthalmologist or otolaryngologist: diplomate, resident, etc.) (2) type of position to be filled; and (3) to whom to write for further information. Unless otherwise requested, listings will be published only once.

The Academy will handle no further correspondence beyond the listing and assume no responsibility. Neither does it endorse nor guarantee any of the published listings.

DIRECTORY OF OPHTHALMIC AND OTOLARYNGIC SOCIETIES

Secretaries of Societies are requested to furnish the information necessary to make this list complete and keep it up to date. Send to TRANSACTIONS, *American Academy of Ophthalmology and Otolaryngology, 15 Second St. S.W., Rochester, Minn.*

EXAMINING AND CERTIFYING BODIES

AMERICAN BOARD OF OPHTHALMOLOGY

CHAIRMAN: Kenneth C. Swan, M.D.
SECRETARY-TREASURER: Dr. Merrill J. King, Ivie Rd., Box 236, Cape Cottage Branch, Portland 9, Maine
ORAL EXAMINATION: October 2-6, 1961, Chicago
FINAL DATE FOR APPLICATION TO TAKE 1961 WRITTEN EXAMINATION: July 1, 1961
WRITTEN EXAMINATION: January 22, 1962

AMERICAN BOARD OF OTOLARYNGOLOGY

PRESIDENT: Bernard J. McMahon, M.D.
SECRETARY-TREASURER: Dr. Dean M. Lierle, University Hospitals, Iowa City
ORAL EXAMINATION: October 28 to November 1, 1962, Chicago
FINAL DATE FOR APPLICATION: March 31, 1962

AMERICAN BOARD OF PLASTIC SURGERY

CHAIRMAN: Dr. James T. Mills
SECRETARY-TREASURER: Dr. Bradford Cannon, 330 Dartmouth St., Boston 16
CORRESPONDING SECRETARY: Estelle E. Hillerich, 4647 Pershing Ave., St. Louis 8
FINAL DATE FOR SUBMITTING CASE REPORTS: January 1, 1961
ORAL AND WRITTEN EXAMINATIONS: May 14-16, 1961; New York City

THE ROYAL COLLEGE OF PHYSICIANS AND SURGEONS OF CANADA

PRESIDENT: Donald A. Thompson, F.R.C.S. (C)
HONORARY SECRETARY: Dr. James H. Graham, 150 Metcalfe St., Ottawa 4, Ont.
TIME AND PLACE: January 18-20, 1962; Royal York Hotel, Toronto, Ont., Canada

INTERNATIONAL

ASIA-PACIFIC ACADEMY OF OPHTHALMOLOGY

PRESIDENT: Dr. Geminiano de Ocampo
SECRETARY-GENERAL: Dr. William John Holmes, 280 Young Hotel Bldg., Honolulu 13, Hawaii
TIME AND PLACE: December 3, 1962; New Delhi, India

EUROPEAN OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Prof. G. von Bahr
SECRETARY: Prof. Jules Francois, 15 Place de Smet de Naeyer, Ghent, Belgium
TIME AND PLACE: 1964; Vienna, Austria

INTERNATIONAL ASSOCIATION FOR THE PREVENTION OF BLINDNESS

PRESIDENT: Prof. A. Franceschetti
SECRETARY: Dr. J. P. Bailliart, 47 rue de Bellechasse, Paris (7e), France
TIME AND PLACE: December 1962; New Delhi

INTERNATIONAL ASSOCIATION OF SECRETARIES OF OPHTHALMOLOGICAL AND OTOLARYNGOLOGICAL SOCIETIES

PRESIDENT: Peter N. Pastore, M.D.
SECRETARY: Dr. J. David Stratton, 1012 Kings Drive, Charlotte, N. C.
TIME AND PLACE: October 10, 1961; Palmer House, Chicago

INTERNATIONAL BRONCHOESOPHAGOLOGICAL SOCIETY

PRESIDENT: Paul H. Holinger, M.D.
SECRETARY: Charles M. Norris, M.D., 3401 North Broad Street, Philadelphia 40
TIME AND PLACE: 1963 meeting not yet scheduled

INTERNATIONAL COLLEGE OF SURGEONS, SECTION ON OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: George E. Shambaugh, Jr., M.D.
SECRETARY-TREASURER: Louis Savitt, M.D., 3404 Lawrence Avenue, Chicago 25
TIME AND PLACE: September 9-14, 1962; Waldorf-Astoria, New York City

INTERNATIONAL FEDERATION OF OPHTHALMOLOGICAL SOCIETIES

PRESIDENT: Sir Stewart Duke-Elder
SECRETARY: Dr. Edward Hartmann, 2 Ave. Ingres, Paris (16e), France
TIME AND PLACE: December 3-7, 1962; New Delhi

INTERNATIONAL ORGANIZATION AGAINST TRACHOMA

PRESIDENT: Prof. G. B. Bietti
SECRETARY-GENERAL: Dr. Jean Sedan, 94 rue Sylvabelle, Marseille (B. du R.), France
TIME AND PLACE: December 1962; New Delhi

PAN-AMERICAN ASSOCIATION OF OPHTHALMOLOGY

PRESIDENT: Jorge Valdeavellano, M.D.
SECRETARY-TREASURER: For North of Panama: Dr. J. Wesley McKinney, 921 Exchange Bldg., Memphis
For South of Panama: Dr. Renato de Toledo, Sao Paulo, Brazil
TIME AND PLACE: February, 1962, Lima Peru and October 4-9, 1964, Montreal, Canada

PAN-AMERICAN ASSOCIATION OF
OTO-RHINO-LARYNGOLOGY AND BRONCHO-ESOPHAGOLOGY

PRESIDENT: Dr. Plinio Barretto
SECRETARY: Dr. Chevalier L. Jackson (deceased)
TIME AND PLACE: 1962; Caracas, Venezuela

FOREIGN

Argentina

SOCIEDAD ARGENTINA DE OFTALMOLOGIA

PRESIDENT: Dr. Baudilio Courtis
SECRETARY: Dr. Roberto Sampaolesi, Santa Fé 1171 Capital Federal
TIME AND PLACE: Third Wednesday of each month; Santa Fé 1171, Buenos Aires

SOCIEDAD de OFTALMOLOGIA de CORDOBA

PRESIDENT: Prof. Dr. Alberto Urrets-Zavalia, Jr., Casilla Correo 301, Cordoba, Argentina
SECRETARY: Dr. Claudio Juarez Beltran
SECRETARY-TREASURER: Dr. Luis Mitnik
MEMBERSHIP: Dr. Juan Remonda and Dr. Dante Yadarola

SOCIEDAD de OFTALMOLOGIA de MENDOZA

PRESIDENT: Dr. Roger E. Zaldivar
SECRETARY: Dr. Luis Felipe Aguinaga, San Martin 1816, Mendoza, Argentina

Australia

OPHTHALMOLOGICAL SOCIETY OF AUSTRALIA (B.M.A.)

PRESIDENT: Dr. T. a'B. Travers
SECRETARY: Dr. John K. Hart, 27 Commonwealth St., Sydney
TIME AND PLACE: October 9-13, 1961; Canberra

Austria

OSTERREICHISCHE OPHTHALMOLOGISCHE GESELLSCHAFT

PRESIDENT: Prof. Dr. K. Hruby
SECRETARY: Dr. Franz Schwab, I. Univ. Augenklinik, Alserstr. 4, Vienna 9

OSTERREICHISCHE OTO-LARYNGOLOGISCHE GESELLSCHAFT

PRESIDENT: Prof. Dr. Otto Novotny
SECRETARY: Dr. Ludwig Bablik, Vienna IX, Alserstrasse 4
TIME: First Tuesday of each month; October to June

OPHTHALMOLOGISCHE GESELLSCHAFT IN WIEN

PRESIDENT: Dozent Dr. F. A. Hamburger
SECRETARY: Dr. H. Schenk, I. Univ. Augenklinik, Alserstr. 4, Vienna 9
TIME AND PLACE: Second Monday—January through December, 2 Univ. Augenklinik, Alserstr. 4, Vienna

Belgium

SOCIETE BELGE D'OPHTALMOLOGIE

SECRETARY: Prof. Dr. M. Applemans, 179 Avenue Ruelens, Louvain

Brazil

CENTRO DE ESTUDOS DE OFTALMOLOGIA

PRESIDENT: Dr. Armando de Arruda Novaes
SECRETARY: Dr. Jose Carlos Gouvea Pacheco, R. Cons. Crispinniano, 53-8, Sao Paulo
TIME AND PLACE: Every Tuesday; R. Condessa de S. Joaquim 288, Sao Paulo

Canada

CANADIAN MEDICAL ASSOCIATION, SECTION OF OPHTHALMOLOGY

CHAIRMAN: Dr. Edward F. Foy
SECRETARY: Dr. Robert W. Robertson, 305 Northgate Bldg., Edmonton, Alta.

CANADIAN OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Dr. B. Alexander
SECRETARY: Dr. R. G. C. Kelly, 90 St. Clair Ave. W., Toronto 7, Ont.

CANADIAN OTOLARYNGOLOGICAL SOCIETY

PRESIDENT: Walter Alexander, M.D.
SECRETARY: Kenneth McAskile, 174 St. George Street, Toronto, Ont.
TIME AND PLACE: June 25-27, 1962; Royal Alexandra Hotel, Winnipeg, Manitoba

THE OPHTHALMOLOGICAL AND OTOLARYNGOLOGICAL SOCIETY OF ALBERTA

PRESIDENT: C. M. Shafto, M.D.
SECRETARY: M. R. Marshall, M.D., North Pavilion, University Hospital, Edmonton, Alberta, Canada

NOVA SCOTIA SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: H. J. Davidson, M.D.
SECRETARY: C. F. Keays, M.D., 324 Spring Garden Rd., Halifax, N. S.
TIME AND PLACE: November, 1961; Halifax, N. S.

THE MONTREAL MEDICO-CHIRURGICAL SOCIETY, SECTION ON OTOLARYNGOLOGY

PRESIDENT: Dr. H. E. McHugh
SECRETARY: Dr. Paul Ittkin, 600 Medical Arts Bldg., Montreal 25, Que.
TIME AND PLACE: November, January, February and April; Teaching Hospitals

MONTREAL OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Dr. John C. Locke
SECRETARY: Dr. J. Noiseux, 400 Sherbrooke Street East

TORONTO ACADEMY OF MEDICINE, SECTION ON OPHTHALMOLOGY

PRESIDENT: J. S. Speakman, M.D.
SECRETARY: Douglas Harper, M.D., Academy of Medicine, Toronto

Chile

SOCIEDAD CHILENA DE OFTALMOLOGIA

PRESIDENT: Dr. Juan Verdaguer
SECRETARY: Dr. Wolfran Rojas, Casilla 13017 Providencia, Santiago

Colombia

SOCIEDAD COLOMBIANA DE OFTALMOLOGIA Y OTO-RINO-LARINGOLOGIA

PRESIDENT: Dr. Alfonso Gaitan Nieto
SECRETARY: Dr. Juan Arciniegas, Calle 47 #5-26, Bogotá
TIME AND PLACE: Monthly; Bogotá

Cuba

SOCIEDAD CUBANA DE OFTALMOLOGIA

PRESIDENT: Dr. Manuel Iglesias Revuelta
SECRETARY: Dr. Jaime Alemany Martorell, 23 #301 esq. a L., Vedado, LaHabana
TIME: Annual in December

Denmark

DANSK OFTALMOLOGISK SELSKAB
(THE DANISH OPHTHALMOLOGICAL SOCIETY)

PRESIDENT: Prof. dr. med. P. Brendstrup
SECRETARY: dr. med. A. Mohneke, Marskensgade 10, Copenhagen
TIME: Meetings held bimonthly; autumn, winter and spring

France

SOCIETE FRANCAISE D'OPHTALMOLOGIE

PRESIDENT: Prof. Guy Offret
SECRETARY: Dr. Gabriel Lombard, 27 rue du Faubourg, St. Jacques, Paris
TIME AND PLACE: Maison de la Chimie, 28 rue Saint Dominique, Paris

SOCIETE FRANCAISE D'OTO-RHINO-LARYNGOLOGIE

PRESIDENT: Prof. André Soulas
SECRETARY: Dr. Henry Guillon, 6 Av. MacMahon, Paris

Germany

DEUTSCHE OPHTHALMOLOGISCHE GESELLSCHAFT

PRESIDENT: Prof. Dr. W. Rohrschneider
SECRETARY: Prof. Dr. W. Jaeger, Univ. Augenklinik, Heidelberg
TIME AND PLACE: September 24-28, 1961; Heidelberg

Great Britain

BRITISH ASSOCIATION OF OTOLARYNGOLOGISTS

PRESIDENT: Mr. V. F. Lambert
SECRETARY: Mr. G. H. Bateman, 47 Lincoln's Inn Fields, London, W. C. 2

FACULTY OF OPHTHALMOLOGISTS

PRESIDENT: Prof. G. I. Scott, F.R.C.S.E.
SECRETARY: Mr. J. R. Hudson, 47 Lincoln's Inn Fields, London, W. C. 2

MIDLAND OPHTHALMOLOGICAL SOCIETY

PRESIDENT: C. H. Bamford
SECRETARIES: W. Martin Walker and A. N. Cameron, 51 Calthorpe Road, Edgbaston, Birmingham 15, England
TIME AND PLACE: September 22, 1961; Annual Meeting

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

PRESIDENT: Mr. Frank W. Law
SECRETARY: Mr. Redmond Smith, 47 Lincoln's Inn Fields, London W. C. 2

OXFORD OPHTHALMOLOGICAL CONGRESS

MASTER: A. B. Nutt
SECRETARY: Mr. Ian C. Fraser, 21 Dogpole, Shrewsbury, Shropshire

THE ROYAL SOCIETY OF MEDICINE, SECTION ON OPHTHALMOLOGY

PRESIDENT: Sir Benjamin Rycroft
SECRETARIES: W. E. S. Bain and Barrie R. Jones, 1 Wimpole Street, London, W.1.
TIME AND PLACE: Second Thursday, October through June; 1 Wimpole St., London, W. 1.

THE ROYAL SOCIETY OF MEDICINE, SECTION ON OTOLOGY

PRESIDENT: Mr. J. P. Monkhouse
SECRETARY: Mr. E. F. Stewart, 33 Alwgue Road, Canonbury London N.1
TIME AND PLACE: First Friday, November through June, except January and April; 1 Wimpole St., London. W. 1.

THE ROYAL SOCIETY OF MEDICINE, SECTION ON LARYNGOLOGY

PRESIDENT: J. H. Otty, F.R.C.S. Ed.
SECRETARIES: E. H. Miles Foxen, F.R.C.S.
Alun B. Thomas, F.R.C.S., 1 Wimpole Street, London, W. 1
TIME AND PLACE: First Friday of the month, November through May

SCOTTISH OPHTHALMOLOGICAL CLUB

PRESIDENT: Dr. J. R. Paterson
SECRETARIES: Dr. C. R. S. Jackson, 1 Melville St., Edinburgh 3
Dr. D. Christison, 21 Eastcote Ave., Glasgow, W. 4

SOUTHERN OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Mrs. Janet Simpson, M.B., Ch.B., D.O.
SECRETARY: Nigel Cridland, D.M., D.O.

India

ALL-INDIA OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Dr. Tulsidas
SECRETARY: Dr. Y. K. C. Pandit, Bombay Mutual Building, Fort, Bombay

BOMBAY OPHTHALMOLOGISTS' ASSOCIATION

PRESIDENT: H. D. Dastoor
SECRETARY: Dr. T. N. Ursekar, T. N. Medical College, Nair Road, Byculla, Bombay 8
TIME AND PLACE: 7:30 p.m., Third Wednesday of each month; various hospitals

THE OPHTHALMOLOGICAL SOCIETY OF BENGAL

PRESIDENT: N. K. Munsi, M.D.
JOINT SECRETARIES: A. K. Sen, M.B., D.O.M.S., and S. Chatterjee, M.B., F.R.C.S.
TIME AND PLACE: Medical College Hospitals, Eye Infirmary, Calcutta, India

Ireland

IRISH OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Dr. L. B. Somerville-Large
SECRETARY: Dr. T. F. Roche, 25 FitzWilliam Pl., Dublin

Italy

SOCIETA OFTALMOLOGICA ITALIANA

PRESIDENT: Prof. Luigi Maggiore
SECRETARY: Prof. E. Leonardi, Piazza Degli Eroi 11, Roma

Mexico

SOCIEDAD MEXICANA de OFTALMOLOGIA

PRESIDENT: Dr. Renan Murillo Fajardo
SECRETARY: Dr. Sabino Silva Zeron, Brasil 33, Mexico 1, D. F.

The Netherlands

NEDERLANDS OOGHEELKUNDIG GEZELSCHAP

PRESIDENT: Prof. Dr. J. E. A. van den Heuvel
SECRETARY: Dr. J. K. Pameijer, Keizerstraat 19, Deventer, The Netherlands
TIME AND PLACE: December 9 and 10, 1961; Nijmegen

New Zealand

THE OPHTHALMOLOGICAL SOCIETY OF NEW ZEALAND

PRESIDENT: Dr. Lindsay Burns
SECRETARY: Dr. Randal Elliott, 89 The Terrace, Wellington C1, N.2
TIME AND PLACE: October 16-20, 1961; Wairakei, North Island, New Zealand

Norway

NORSK OFTALMOLOGISK FORENING

PRESIDENT: Dr. Einar Trumpy
SECRETARY: Otto Johansen, Teatergarten 11, Oslo
TIME AND PLACE: Four times a year; Rikshospitalets Øyeavdeling, Oslo

Pakistan

OPHTHALMOLOGICAL SOCIETY OF PAKISTAN

PRESIDENT: Lt. Gen. S. M. A. Farugi
SECRETARY: Dr. Raja Mumtaz, 70 Nedous Hotel, Lahore
TIME AND PLACE: K. E. Medical College, Lahore

Paraguay

SOCIETY OF OPHTHALMOLOGY OF PARAGUAY

PRESIDENT: Dr. Honorio Campuzano
SECRETARY: Emilio Gonzales Gini, Estados Unidos 183 Asunción, Paraguay
TIME AND PLACE: Monthly; Circulo Paraguayo de Medicos, Asunción

Philippine Islands

OPHTHALMOLOGICAL SOCIETY OF THE PHILIPPINES

PRESIDENT: Edgardo Caparas, M.D.
SECRETARY-TREASURER: Ascuncion N. Fernando, M. D., Ramon Magsaysay Memorial Medical Center, Aurora Blvd., Manila

PHILIPPINE OPHTHALMOLOGICAL AND OTO-RHINOLARYNGOLOGICAL SOCIETY

PRESIDENT: Macario G. Tan, M.D.
SECRETARY: Jose O. Chan, M.D., North General Hospital, Rizal Avenue, Manila

THE PHILIPPINE SOCIETY OF BRONCHOESOPHAGOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Antonio Roxas, M.D.
SECRETARY: Eusebio Llamas, M.D., University of Santo Tomas, Espana, Manila

Spain

INSTITUTO BARRAQUER

PRESIDENT: Ignacio Barraquer, M.D.
SECRETARY: Joaquin Rutllan, M.D., Instituto Barraquer, Laforja 88, Barcelona, Spain
TIME AND PLACE: December; 1961

Sweden

SVENSKA OGONLAKAREFORENINGEN,
SVENSKA LAKARESALLSKAPETS SEKTION FOR OFTALMOLOGI

PRESIDENT: Professor G. von Bahr, M.D.
SECRETARY: Dr. J. Rendahl, Eye Clinic Karolinska Sjukhuset, Stockholm 60
TIME AND PLACE: December 2, 1961, Stockholm; February-March, 1962, Halmsted; and June 1962, Uppsala

Union of South Africa

THE OPHTHALMOLOGICAL SOCIETY OF SOUTH AFRICA

PRESIDENT: Dr. H. J. Hamelberg
SECRETARY: Dr. E. T. Meyer, 220 Lister Bldg., Jeppe St., Johannesburg

Venezuela

SOCIEDAD VENEZOLANA DE OTORINOLARINGOLOGIA

PRESIDENT: Dr. Oscar Bustamante Miranda
SECRETARY: Dr. R. Marquez Landaeta, Colegio de Medicos, Los Chaguaramos Caracas, Venezuela
TIME AND PLACE: November 16-19, 1961; Valencia. Edo. Carabobo

NATIONAL

AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Dohrmann K. Pischel, M.D.
EXECUTIVE SECRETARY-TREASURER: William L. Benedict, M.D., 15 Second St. S.W., Rochester, Minn.
TIME AND PLACE: November 4 to 9, 1962; Las Vegas, Nevada

AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

PRESIDENT: Alden H. Miller, M.D.
SECRETARY: Daniel C. Baker, Jr., M.D., 903 Park Avenue, New York 21
TIME AND PLACE: May 1 and 2, 1962; Sheraton-Dallas Hotel, Dallas, Texas

AMERICAN LARYNGOLOGICAL ASSOCIATION

PRESIDENT: Dean M. Lierle, M.D.
SECRETARY: Lyman G. Richards, M.D., 12 Clovelly Road, Wellesley Hills 81, Mass.
TIME AND PLACE: May 4 and 5, 1962; Sheraton-Dallas Hotel, Dallas, Texas

AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY, INC.

PRESIDENT: Fletcher D. Woodward, M.D.
SECRETARY: C. Stewart Nash, M.D., 708 Medical Arts Bldg., Rochester 7, N. Y.

EASTERN SECTION

CHAIRMAN: Frank D. Lathrop, M.D.
SECRETARY: Alfred W. Doust, M.D., State Tower Bldg., Syracuse, N. Y.

SOUTHERN SECTION

CHAIRMAN: Peter N. Pastore, M.D.
SECRETARY: James A. Harrill, M.D., Bowman Gray School of Medicine, Winston-Salem, N. C.

MIDDLE SECTION

SECRETARY: Myron Hipskind, M.D., Suite 3000, 55 East Washington Street, Chicago

WESTERN SECTION

CHAIRMAN: Joel J. Pressman, M.D.
SECRETARY: Francis A. Sooy, M.D., 490 Post Street, San Francisco

AMERICAN MEDICAL ASSOCIATION, SECTION ON LARYNGOLOGY, OTOLOGY AND RHINOLOGY

CHAIRMAN: Howard P. House, M.D.
SECRETARY: Walter E. Heck, M.D., Stanford Hospital, San Francisco 15
TIME AND PLACE: June 11-15, 1962; Chicago

AMERICAN MEDICAL ASSOCIATION, SECTION ON OPHTHALMOLOGY

CHAIRMAN: Banks Anderson, M.D.
SECRETARY: Henry F. Allen, M.D., 200 Beacon St., Boston 16, Mass.

AMERICAN OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Francis Heed Adler, M.D.
SECRETARY-TREASURER: Joseph A. C. Wadsworth, M.D., 108 East 68th Street, New York 21
TIME AND PLACE: May 28-30, 1962; Homestead Hotel, Hot Springs, Va.

AMERICAN OTOLOGICAL SOCIETY, INC.

PRESIDENT: Lawrence R. Boies, M.D.
SECRETARY-TREASURER: James A. Moore, M.D., 525 East 68th Street, New York 21
TIME AND PLACE: April 29th and 30th, 1962; Sheraton-Dallas Hotel, Dallas, Texas

THE AMERICAN OTORHINOLOGIC SOCIETY FOR PLASTIC SURGERY, INC.

PRESIDENT: Louis J. Feit, M.D.
SECRETARY: Joseph G. Gilbert, M.D., 75 Barberry Lane, Roslyn Heights, N. Y.
TIME AND PLACE: March, 1962; Philadelphia

AMERICAN SOCIETY OF FACIAL PLASTIC SURGERY

PRESIDENT: Sam H. Sanders, M.D.
SECRETARY: Samuel M. Bloom, M.D., 123 E. 83rd St., New York 28
TIME AND PLACE: January 19, 1962, Hotel Elysee, New York City; March 3-5, 1962, Roosevelt Hotel, New Orleans

AMERICAN SOCIETY FOR HEAD AND NECK SURGERY

PRESIDENT: John J. Conley, M.D.
SECRETARY: George A. Sisson, M.D., 1200 East Genesee Street, Syracuse 10
TIME AND PLACE: October 7, 1961; Palmer House, Chicago

AMERICAN SOCIETY OF OPHTHALMOLOGIC AND OTOLARYNGOLOGIC ALLERGY

PRESIDENT: Leland H. Prewitt, M.D.
SECRETARY: Daniel S. De Stio, M.D., 121 South Highland Avenue, Pittsburgh 6
TIME AND PLACE: October 7, 1961; Sherman Hotel, Chicago

ASSOCIATION FOR RESEARCH IN OPHTHALMOLOGY, INC.

CHAIRMAN: V. Everett Kinsey, Ph.D.
SECRETARY: Monte G. Holland, M.D., 1430 Tulane Avenue, New Orleans 12
TIME AND PLACE: December 4-6, 1961; Statler Hotel, Detroit

NATIONAL SOCIETY FOR THE PREVENTION OF BLINDNESS

PRESIDENT: Mr. Enos Curtin
EXECUTIVE DIRECTOR: John W. Ferree, M.D.
SECRETARY: Regina E. Schneider; NSPB New Address: 16 East 40th Street, New York 16
TIME AND PLACE: April 11-13, 1962; Sheraton-Lincoln Hotel, Indianapolis

NATIONAL MEDICAL FOUNDATION FOR EYE CARE

PRESIDENT: Ralph O. Rychener, M.D.
SECRETARY: Charles E. Jaeckle, M.D., 250 West 57th Street, New York 19
TIME AND PLACE: October 8, 1961; Chicago

OTOSCLEROSIS STUDY GROUP

PRESIDENT: Arthur L. Juers, M.D.
SECRETARY: Raymond Jordan, M.D., 3515 Fifth Ave., Pittsburgh

PUERTO RICAN OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Manuel N. Miranda, M.D.
SECRETARY: Guillermo Picó, M.D., 1475 Wilson Ave., Santurce
TIME AND PLACE: Bimonthly; Puerto Rican Medical Association Bldg.

SOCIETY OF MILITARY OPHTHALMOLOGISTS

PRESIDENT: Lt. Col. Charles O. Rixey, USA MC
SECRETARY: Maj. Melvin J. White, USAF MC, USAF Hospital, MacDill AFB, Florida
TIME AND PLACE: October 10, 1961; Palmer House, Chicago

SOCIETY OF MILITARY OTOLARYNGOLOGISTS

PRESIDENT: Col. James E. Lett, USAF MC
SECRETARY-TREASURER: Capt. G. W. Hurst, MC, USN, U. S. Naval Hospital, Great Lakes, Ill.
TIME AND PLACE: October, 1961; Chicago

REGIONAL

ARK-LA-TEX OTO-OPHTHALMIC SOCIETY

PRESIDENT: Paul Swearingen, M.D.
SECRETARY: John P. Robinson, M.D., 2515 Line Avenue, Shreveport
TIME AND PLACE: 7:00 p.m., First Monday of each month, September through June; Confederate Memorial Hospital, Shreveport, La.

LOUISIANA-MISSISSIPPI OPHTHALMOLOGICAL AND OTOLARYNGOLOGICAL SOCIETY

PRESIDENT: Carl E. Granberry, M.D.
SECRETARY: Edley H. Jones, M.D., 1301 Washington St., Vicksburg, Miss.
TIME AND PLACE: April 13 and 14, 1962; Edgewater Gulf Hotel, Edgewater Park, Miss.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Lawrence Dame, M.D.
SECRETARY: Alfred W. Scott, M.D., 7 Bay State Road, Boston 15, Mass.
TIME AND PLACE: Third Wednesday, November through April; Massachusetts Eye and Ear Infirmary, 243 Charles St., Boston

NEW ENGLAND OTO-LARYNGOLOGICAL SOCIETY

PRESIDENT: Frank Turchik, M.D.
SECRETARY: Burton E. Lovesey, M.D., 15 W. Central St., Natick, Mass.
PLACE: Massachusetts Eye and Ear Infirmary, 243 Charles St., Boston

PACIFIC COAST OTO-OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Clarence W. Trexler, M.D.
SECRETARY: Alden H. Miller, M.D., 500 South Lucas Avenue, Los Angeles 17
TIME AND PLACE: June 21-29, 1962; Princess Kaiulani Hotel, Honolulu

SIOUX VALLEY ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: W. C. Boden, M.D.
SECRETARY: Verne R. Heimann, M.D., 507 7th Street, Sioux City, Iowa
TIME AND PLACE: February 21-23, 1962; Sheraton-Martin Hotel, Sioux City

SOUTHERN MEDICAL ASSOCIATION SECTION ON OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Miles L. Lewis, Jr., M.D.
SECRETARY: Dr. Albert C. Esposito, First Huntington National Bank Bldg., Huntington, W. Va.
TIME AND PLACE: November, 1961; Dallas

WISCONSIN-UPPER MICHIGAN SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: W. J. Troup, M.D.
SECRETARY: G. L. McCormick, M.D., 630 S. Central Ave., Marshfield, Wis.

STATE AND LOCAL

Alabama

ALABAMA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Paul S. Mertins, M.D.
SECRETARY: Karl B. Benkwith, M.D., 234 South Hull Street, Montgomery 4
TIME AND PLACE: Tuscaloosa, Alabama; preceding Alabama State Medical Meeting

THE BIRMINGHAM EYE, EAR, NOSE AND THROAT SOCIETY

PRESIDENT: Each member in alphabetical order
SECRETARY: Joseph M. Dixon, M.D., 101 Medical Arts Bldg., Birmingham 5
TIME AND PLACE: Monthly; The Club

Arizona

PHOENIX OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Virgil A. Toland, M.D.
SECRETARY: Roy E. Burgess, M.D., 461 West Catalina Drive, Phoenix
TIME AND PLACE: 6:30 p.m., Third Thursday every other month; Westward Ho Hotel

Arkansas

ARKANSAS MEDICAL SOCIETY, EYE, EAR, NOSE AND THROAT SECTION

PRESIDENT: John Dodson, M.D.
SECRETARY: James L. Smith, M.D., 623 Woodlane, Little Rock

California

CALIFORNIA MEDICAL ASSOCIATION, EYE SECTION

PRESIDENT: Floyd M. Bond, M.D.
SECRETARY: Richard A. Westsmith, M. D., 12 North El Camino Real, San Mateo
TIME AND PLACE: April 11-15, 1962; Fairmont Hotel, San Francisco

CALIFORNIA MEDICAL ASSOCIATION, EAR, NOSE AND THROAT SECTION

PRESIDENT: Marvin W. Simmons, M.D.
SECRETARY: Henry L. Harris, M.D., 3875 Wilshire Blvd., Los Angeles
TIME AND PLACE: April 15-18, 1962; Fairmont Hotel, San Francisco

ALTA CALIFORNIA OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Arthur R. Kahler, M.D.
SECRETARY: Julian I. Fisher, M.D., 2600 Capitol Avenue, Sacramento
TIME AND PLACE: Third Thursday of each month; Sutter Club, Sacramento

EAST BAY OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Ford Keppen, M.D.
SECRETARY: Lionel Sorenson, M.D., 2320 Channing Way, Berkeley, Calif.

LOS ANGELES OPHTHALMOLOGICAL JOURNAL CLUB

PRESIDENT: Henry Montross, M.D.
SECRETARY: Jacob M. Kline, M.D., 4070 Buckingham Road, Los Angeles 8
TIME AND PLACE: 8:00 p.m., Second Monday of each month, Los Angeles County Medical Association Bldg., 1925 Wilshire Blvd., Los Angeles

LOS ANGELES SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Richard P. Kratz, M.D.
SECRETARY: Harold M. Boyd, M.D., 2010 Wilshire Blvd., Los Angeles 57
TIME AND PLACE: Ophthalmology, 6:00 p.m., First Thursday of each month;
Otolaryngology, 6:00 p.m., Fourth Monday of each month;
Los Angeles County Medical Association Bldg., 1925 Wilshire Blvd., Los Angeles

PENINSULA EYE SOCIETY

PRESIDENT: Frank D. Berry, M.D.
SECRETARY: Rod Abernethy, M.D., 401 North San Mateo Drive, San Mateo
TIME: Third Thursday evening of each month

SAN DIEGO OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Martin P. Koke, M.D.
SECRETARY: Cody L. Smith, M.D., 125 Prescott Avenue, El Cajon, Calif.
TIME AND PLACE: First Monday of each month, Mission Valley Inn

SAN FRANCISCO MEDICAL SOCIETY, EYE SECTION

CHAIRMAN: Alan J. Rosenberg, M.D., 450 Sutter Street, San Francisco
TIME AND PLACE: Quarterly; San Francisco County Medical Bldg.

SAN FRANCISCO OPHTHALMOLOGICAL ROUND TABLE

PRESIDENT: O. Ralph Tanner, M.D.
SECRETARY-TREASURER: Albert J. Brinckerhoff, M.D., 490 Post St., San Francisco 2

SANTA BARBARA OPHTHALMOLOGICAL SOCIETY

CHAIRMAN: Harold B. Alexander, M.D.
SECRETARY-TREASURER: F. J. Kanofsky, M.D., 1734 State Street, Santa Barbara, Calif.
TIME AND PLACE: 7:30 p.m., Fourth Thursday evening of each month, St. Francis Hospital Library

TRI-COUNTY SOCIETY OF OPHTHALMOLOGY

PRESIDENT: Louis George, M.D.
SECRETARY: Jerry Donin, M.D., 1129 North Garey Avenue, Pomona, Calif.

Colorado

COLORADO OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Morris Kaplan, M.D.
SECRETARY: Max Kaplan, M.D., 216 Republic Bldg., Denver 2
TIME AND PLACE: Third Saturday of each month, September through April; University of Colorado Medical Center, 4200 E. Ninth Ave., Denver

COLORADO OTOLARYNGOLOGICAL SOCIETY

PRESIDENT: James V. Carris, M.D.
SECRETARY: Harland Close, M.D., 974 South Josephine, Denver
TIME AND PLACE: First Saturday of each month; October through June, Colorado General Hospital

Connecticut

CONNECTICUT STATE MEDICAL SOCIETY, EYE, EAR, NOSE AND THROAT SECTION

PRESIDENT: John P. Simses, M.D.
SECRETARY: Arthur C. Unsworth, M.D., 85 Jefferson Street, Hartford 14

District of Columbia

MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA, SECTION ON OPHTHALMOLOGY

PRESIDENT: Paul E. Zehfuss, M.D.
SECRETARY: Charles W. Sprunt, M.D., 1302 18th Street N. W., Washington, D. C.
TIME AND PLACE: 6:00 p.m.; First Tuesday of each month, Kennedy Warren Hotel

MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA, SECTION ON OTOLARYNGOLOGY

PRESIDENT: Adrian J. Delaney, M.D.
SECRETARY: Joseph M. Daly, M.D., 1830 K Street N. W., Washington, D. C.
TIME AND PLACE: 6:30 p.m., Second Tuesday of November, January, March and May; Army Navy Club

Florida

FLORIDA SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: William H. Anderson, Jr., M.D.
SECRETARY: Manuel A. Schofman, M.D., 9526 N. E. Second Avenue, Miami
TIME AND PLACE: May 1962; Americana Hotel, Miami Beach

GREATER MIAMI EYE, EAR, NOSE AND THROAT SOCIETY

PRESIDENT: Joseph Freeman, M.D.
SECRETARY: Collins W. Swords, M.D., Huntington Medical Bldg., Miami 32
TIME AND PLACE: Quarterly; Columbus Hotel

Georgia

GEORGIA SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: C. W. Whitworth, M.D.
SECRETARY: James T. King, M.D., 340 Boulevard N. E., Atlanta 12
TIME AND PLACE: March 22-24, 1962; General Oglethorpe Hotel, Savannah

ATLANTA EYE, EAR, NOSE AND THROAT SOCIETY

PRESIDENT: Lester A. Brown, M.D.
SECRETARY: Harry Arnold, M.D., 1293 Peachtree N. E.
TIME AND PLACE: 7:30 p.m., Fourth Monday of each month; Fulton County Academy of Medicine

Hawaii

HAWAII EYE, EAR, NOSE AND THROAT SOCIETY

PRESIDENT: W. T. Minatoya, M.D.
SECRETARY: Herbert G. Pang, M.D., Suite 202, Nuuanu Medical Center, 1374 Nuuanu Avenue, Honolulu 17, Hawaii
TIME AND PLACE: Third Thursday of each month; Pacific Club

Illinois

CENTRAL ILLINOIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Dr. G. E. Hartenbower
SECRETARY: Dr. C. L. Pannabecker, 434 Jefferson Bldg., Peoria, Ill.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY

PRESIDENT: Linden J. Wallner, M.D.
SECRETARY-TREASURER: John J. Ballenger, M.D., 723 Elm Street, Winnetka, Ill.
TIME AND PLACE: First Monday of each month, October through May; Furniture Club of America, 666 N. Lake Shore Dr., Chicago

CHICAGO OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Earl Merz, M.D.
SECRETARY: David Shoch, M.D., 700 North Michigan Ave., Chicago 11
TIME AND PLACE: Third Monday of each month, October to May; Illini Union, 715 S. Wood St., Chicago

Indiana

INDIANA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Guy A. Owsley, M.D.
SECRETARY: Lewis E. Morrison, M.D., 603 Hume-Mansur Bldg., Indianapolis 4

INDIANAPOLIS OPHTHALMOLOGICAL AND OTOLARYNGOLOGICAL SOCIETY

PRESIDENT: Theodore F. Schlaegel, M.D., Jr.
SECRETARY: Theodore R. LeMaster, M.D., 305 Hume Mansur Bldg., Indianapolis
TIME AND PLACE: 6:30 p.m., Second Thursday of each month, November through May; Indianapolis Athletic Club

Iowa

IOWA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Chester C. Woodburn, Jr., M.D.
SECRETARY: William Huffman, M.D., University Hospitals, Iowa City

DES MOINES ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Robert H. Foss, M.D.
SECRETARY: J. H. McNamee, M.D., 306 Equitable Bldg., Des Moines 9, Iowa
TIME AND PLACE: Quarterly: last Monday of the month; Des Moines Club

Kentucky

LOUISVILLE EYE AND EAR SOCIETY

PRESIDENT: Albert Leggett, Jr., M.D.
SECRETARY: Roderick MacDonald, Jr., M.D., 323 East Chestnut Street, Louisville
TIME AND PLACE: Bimonthly; Provincial House

Louisiana

NEW ORLEANS GRADUATE MEDICAL ASSEMBLY

PRESIDENT: Barrett Kennedy, M.D.
SECRETARY: Mannie D. Paine, Jr., M.D., Room 105, 1430 Tulane Ave., New Orleans
TIME AND PLACE: March 12-15, 1962; Roosevelt Hotel, New Orleans

Maryland

BALTIMORE CITY MEDICAL SOCIETY, OPHTHALMOLOGICAL SECTION

PRESIDENT: Arnall Patz, M.D.
SECRETARY: Richard E. Hoover, M.D., 14 W. Mt. Vernon Place, Baltimore

BALTIMORE EAR, NOSE AND THROAT SOCIETY

PRESIDENT: Francis Catlin, M.D.
SECRETARY: Frank P. Dwyer, Jr., M.D., 2 East Read Street, Baltimore 2
TIME AND PLACE: December 5, 1961; February 6, 1962; April 3, 1962; Sheraton Baltimore Inn, 6:30 P.M.

Massachusetts

MASSACHUSETTS MEDICAL SOCIETY
SECTION ON OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Francis L. Weille, M.D.
SECRETARY: Robert E. Klotz, M.D., Salada Bldg., Berkley and Stuart Streets, Boston 16
TIME AND PLACE: May 1962; Hotel Statler, Boston

BOSTON CITY HOSPITAL AURAL AND OPHTHALMIC ALUMNI SOCIETY

PRESIDENT: Joseph J. Fischer, M.D.
SECRETARY: Frederick L. Landrigan, M.D., 520 Commonwealth Ave., Boston 15

Michigan

MICHIGAN STATE MEDICAL SOCIETY, SECTION ON OPHTHALMOLOGY

CHAIRMAN: Paul L. Cusick, M.D.
SECRETARY: Paul Van Portfliet, M.D., 26 Sheldon Avenue S.E., Grand Rapids

MICHIGAN STATE MEDICAL SOCIETY, SECTION ON OTOLARYNGOLOGY

CHAIRMAN: V. E. Cortopassi, M.D.
SECRETARY: Donald S. Bolstad, M.D., Henry Ford Hospital, Detroit
TIME AND PLACE: September 28, 1961; Pantland Hotel, Grand Rapids, Mich.

MICHIGAN TRIOLOGICAL SOCIETY

PRESIDENT: Thomas W. Kavanagh, M.D.
SECRETARY: Richard C. Parsons, M.D., 513 Michigan National Bank Bldg., Battle Creek
TIME AND PLACE: Third Thursday of each month; September through June

DETROIT OPHTHALMOLOGICAL CLUB

PRESIDENT: Members in rotation
SECRETARY-TREASURER: Horace L. Weston, M.D., 703 Mutual Bldg., Detroit 26
TIME AND PLACE: Second Tuesday of November, December, February and March; January and April meetings irregular

DETROIT OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Henry A. Dunlap, M.D.
SECRETARY: H. Saul Sugar, M.D., 28 West Adams, Detroit
TIME AND PLACE: Fourth Thursday of each month; Wayne County Medical Society

DETROIT OTOLARYNGOLOGICAL SOCIETY

PRESIDENT: Ned I. Chalat, M.D.
SECRETARY: Harold Schuknecht, M.D., Henry Ford Hospital, Detroit
TIME AND PLACE: 7:00 p.m., Third Wednesday of each month; Wayne County Medical Society Bldg., Detroit

SAGINAW VALLEY ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Joseph H. Bergin, M.D.
SECRETARY: Arno Weiss, M.D., 3521 State St., Saginaw
TIME AND PLACE: First Tuesday of each month; High-Life Inn, Saginaw

Minnesota

MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Jerome Hilger, M.D.
SECRETARY-TREASURER: Richard O. Leavenworth, Jr., M.D., 4959 Excelsior Blvd., Minneapolis 16
TIME AND PLACE: Second Friday November through May; Minneapolis Club, Minneapolis; Minnesota Club, St. Paul

Missouri

KANSAS CITY SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Albert N. Lemoine, Jr., M.D.
SECRETARY: Earl G. Padfield, M.D., 4706 Broadway, Kansas City, Mo.

EAR, NOSE AND THROAT CLUB OF ST. LOUIS

CHAIRMAN: Alfred J. Cone, M.D.
SECRETARY: Daniel D. Klaff, M.D., 3720 Washington Blvd., St. Louis 8
TIME AND PLACE: Third Wednesday of January, March, May and November; University Club

ST. LOUIS OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Bennett Y. Alvis, M.D.
SECRETARY: Robert A. Moses, M.D., 640 South Kingshighway, St. Louis 10
TIME AND PLACE: 6:30 p.m., 4th Thursday each month, except November and December, Park Plaza Hotel

Montana

MONTANA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: H. D. Harlow, M.D.
SECRETARY: James Morrison, M.D., 1231 N. Broadway, Billings

Nebraska

NEBRASKA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Paul Peterson, M.D.
SECRETARY: E. S. Maness, M.D., 1006 Sharp Bldg., Lincoln
TIME AND PLACE: November, 1961; Omaha

OMAHA EYE , EAR, NOSE AND THROAT SOCIETY

PRESIDENT: John Filkins, M.D.
SECRETARY: Ray O. Gillies, Jr., M.D., 631 Medical Arts Bldg., Omaha
TIME AND PLACE: Third Wednesday of January, March, April, September and November; Omaha Club, 20th and Douglas

New Jersey

ACADEMY OF MEDICINE OF NEW JERSEY EYE, EAR, NOSE AND THROAT SECTION

PRESIDENT: Leon J. Schwartz, M.D.
SECRETARY: Walter T. Rados, M.D., 31 Lincoln Park, Newark, N. J.
TIME AND PLACE: Academy of Medicine of New Jersey; 307-317 Belleville Ave., Bloomfield, N. J.

MEDICAL SOCIETY OF NEW JERSEY, SECTION ON OPHTHALMOLOGY

PRESIDENT: Henry Abrams, M.D.
SECRETARY: Alfonse Cinotti, M.D., 3285 Hudson Blvd., Jersey City, N. J.
TIME AND PLACE: May 16, 1962; Haddon Hall Hotel, Atlantic City

NEW JERSEY ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Joseph R. Burns, M.D.
SECRETARY: John Scillieri, M.D., 660 Broadway, Paterson
TIME AND PLACE: May, 1962; Atlantic City

NEW JERSEY OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Samuel Diskan, M.D.
SECRETARY: Oram Kline, Jr., M.D., 524 Cooper Street, Camden
TIME AND PLACE: November, Princeton; May, Atlantic City

New Mexico

NEW MEXICO OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Howard Peck, M.D.
SECRETARY: James T. McGuckin, M.D., 303 Mulberry N. E.

New York

NEW YORK ACADEMY OF MEDICINE, SECTION ON OPHTHALMOLOGY

PRESIDENT: Byron Smith, M.D.
SECRETARY: Max Chamlin, M.D., 8 East 77th Street, New York 21
TIME AND PLACE: Third Monday of each month; November through May at 8:00 p.m., New York Academy of Medicine, 2 East 103rd Street, New York 29

NEW YORK ACADEMY OF MEDICINE, SECTION ON OTOLARYNGOLOGY

CHAIRMAN: Duncan R. McCuaig, M.D.
SECRETARY: David I. Frank, M.D., 39 Gramercy Park, New York
TIME AND PLACE: 8:30 p.m., Third Wednesday of each month; New York Academy of Medicine, 2 E. 103rd St., New York 29

NEW YORK SOCIETY FOR CLINICAL OPHTHALMOLOGY

PRESIDENT: Alfred Kestenbaum, M.D. (deceased)
SECRETARY: Alan H. Barnert, M.D., 960 Park Avenue, New York 28
TIME AND PLACE: First Monday of the month, except January; New York Academy of Medicine, 2 E. 103rd St., New York 29

CENTRAL NEW YORK EYE, EAR, NOSE AND THROAT SOCIETY

PRESIDENT: Richard Sullivan, M.D.
SECRETARY: David L. Poushter, M.D., 700 East Jefferson Street, Syracuse 3
TIME AND PLACE: November and April, University Club, Syracuse

EASTERN NEW YORK EYE, EAR, NOSE AND THROAT ASSOCIATION

PRESIDENT: Henry Dubins, M.D.
SECRETARY-TREASURER: Ernest Kopp, M.D., 761 Madison Avenue, Albany

ALUMNI ASSOCIATION OF THE NEW YORK EYE AND EAR INFIRMARY

PRESIDENT: Jay G. Linn, Jr., M.D.
SECRETARIES: Vincent Carter, Jr., M.D. and Merrill Goodman, M.D.; 218 Second Avenue, New York 3
TIME AND PLACE: October meeting Palmer House, Chicago; April meeting in New York City

SECTION ON LARYNGOLOGY, RHINOLOGY AND OTOLOGY OF THE MEDICAL SOCIETY OF THE COUNTY OF KINGS AND ACADEMY OF MEDICINE OF BROOKLYN

PRESIDENT: Nathan Thaler, M.D.
SECRETARY-TREASURER: Adolph Wolferman, M.D., 153 Pierrepont Street, Brooklyn 1

BROOKLYN OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Edward Saskin, M.D.
SECRETARY: A. B. Rizzuti, M.D., 160 Henry Street, Brooklyn
TIME: Fourth Monday of November, January, March and April

BUFFALO OPHTHALMOLOGICAL CLUB

PRESIDENT: Charles H. Addington, M.D.
SECRETARY: John P. Luhr, M.D., 40 West North Street, Buffalo 2
TIME AND PLACE: Second Thursday each month; Statler-Hilton Hotel, Buffalo

LONG ISLAND OPHTHALMOLOGICAL SOCIETY

PRESIDENT: John R. Roche, M.D.
SECRETARY: Gerald M. Branower, M.D., 36 Barstow Road, Great Neck, N. Y.
TIME AND PLACE: Dinner Meetings; Fourth Monday of February, April, September and November

NASSUA ACADEMY OF MEDICINE, SECTION ON OPHTHALMOLOGY

CHAIRMAN: Wendell L. Hughes, M.D.
SECRETARY-TREASURER: Arthur E. Merz, M.D., 520 Franklin Avenue, Garden City , N. Y.
TIME AND PLACE: Fourth Monday of January, May and November; Nassua Academy of Medicine, 1200 Stewart Ave., Garden City, N. Y.

North Carolina

NORTH CAROLINA EYE, EAR, NOSE AND THROAT SOCIETY

PRESIDENT: George T. Noel, M.D.
SECRETARY: John S. Gordon, M.D., 1350 South Kings Drive, Charlotte, N. C.

Ohio

AKRON ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: C. T. Korsmo, M.D.
SECRETARY-TREASURER: F. M. Krichbaum, M.D., 175 South Main Street, Akron 8
TIME AND PLACE: 6:30 p.m., First Monday of October, December, February and May; Akron City Club, Akron

CINCINNATI OTOLARYNGOLOGICAL SOCIETY

PRESIDENT: Raymond L. Pfister, M.D.
SECRETARY: William Schrimpf, M.D., 3035 Clifton Avenue, Cincinnati 20
TIME AND PLACE: Third Monday of each month; Academy of Medicine Bldg., Cincinnati

CLEVELAND OPHTHALMOLOGICAL CLUB

PRESIDENT: Jerome Gans, M.D.
SECRETARY: Hiram H. Hardesty, M.D., 10515 Carnegie Avenue, Cleveland
TIME AND PLACE: November 14; January 9; February 13; April 10; Wade Park Manor

CLEVELAND OTOLARYNGOLOGICAL CLUB

PRESIDENT: F. R. Tingwald, M.D.
SECRETARY: William J. Loeb, M.D., 10300 Carnegie Avenue, Cleveland
TIME AND PLACE: Second Wednesday of November, February, April and May

COLUMBUS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Morris L. Battles, M.D.
SECRETARY-TREASURER: Richard H. Wehr, M.D., 150 Broad Street, Columbus 15
TIME AND PLACE: First Monday of each month, October through April; University Club, 40 S. Third St., Columbus

TOLEDO EYE, EAR, NOSE AND THROAT SOCIETY

PRESIDENT: Jerry W. Draheim, M.D.
SECRETARY: A. James Blanchard, M.D., 3100 West Central Avenue
TIME AND PLACE: 6:00 p.m., Third Tuesday of each month, November through June; Toledo Club

Oklahoma

OKLAHOMA CITY ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: J. C. Pickard, M.D.
SECRETARY: Robert Trent, M.D., 554 Pasteur Bldg., Oklahoma City
TIME AND PLACE: Quarterly; University Hospital

Oregon

OREGON ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Richard E. Markely, M.D.
SECRETARY: Edward N. McLean, M.D., 621 High Street, Oregon City
TIME AND PLACE: 6:30 p.m., Fourth Tuesday of each month excepting December; Aero Club of Oregon, 804 S. W. Taylor St., Portland

Pennsylvania

PENNSYLVANIA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Benjamin H. Shuster, M.D.
SECRETARY: Daniel S. De Stio, M.D., 121 South Highland Ave., Pittsburgh
TIME AND PLACE: May 16-20, 1962; Bedford Springs Hotel, Bedford, Pa.

WESTERN PENNSYLVANIA EYE, EAR, NOSE AND THROAT SOCIETY

PRESIDENT: Edwin C. Miller, M.D.
SECRETARY-TREASURER: F. E. Murdock, M.D., 28½ W. Scribner Ave., DuBois
TIME AND PLACE: Third Thursday of May and October; Indiana, Pennsylvania

WYOMING VALLEY EYE, EAR, NOSE AND THROAT CLUB

PRESIDENT: Lewis S. Reese, M.D.
SECRETARY: Albert J. Abbott, M.D., 203 E. Green St., Nanticoke
TIME AND PLACE: Last Tuesday of each month, October through April; Luzerne County Medical Society Bldg., S. Franklin St., Wilkes-Barre

PHILADELPHIA COLLEGE OF PHYSICIANS, SECTION ON OPHTHALMOLOGY

SECRETARY: Thomas H. Cowan, M.D., 1930 Chestnut Street, Philadelphia
TIME AND PLACE: Third Thursday of each month, October to May; College of Physicians, 19 S. 22nd St., Philadelphia

PHILADELPHIA COUNTY MEDICAL SOCIETY, EYE SECTION

CHAIRMAN: William C. Frayer, M.D.
SECRETARY: Ralph C. Lanciano, M.D., 259 South 17th Street, Philadelphia
TIME AND PLACE: Third Thursday of each month; Philadelphia County Medical Society Bldg., 301 S. 21st St., Philadelphia

PHILADELPHIA LARYNGOLOGICAL SOCIETY

PRESIDENT: Joseph P. Atkins, M.D.
SECRETARY: Charles M. Norris, M.D., 3401 North Broad Street, Philadelphia 40
TIME AND PLACE: First Tuesday of October, December, April and May; College of Physicians Bldg., Philadelphia

PITTSBURGH OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Harvey E. Thorpe, M.D.
SECRETARY: Myles M. Berk, M.D., 4101 Jenkins Arcade, Pittsburgh 22
TIME AND PLACE: Third Monday of each month; Mellon Institute

PITTSBURGH OTOLOGICAL SOCIETY

PRESIDENT: John Dickinson, M.D.
SECRETARY: Clyde B. Lamp, Jr., M.D., 8101 Jenkins Arcade, Pittsburgh 22

READING EYE, EAR, NOSE AND THROAT SOCIETY

PRESIDENT: Arthur Cope, M.D.
SECRETARY: James H. Parker, Jr., M.D., 238 N. Fifth St., Reading
TIME AND PLACE: 5:30 p.m., Third Wednesday of each month, September through April; Wyomissing Club

South Carolina

SOUTH CAROLINA SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: S. H. Ross, M.D.
SECRETARY-TREASURER: Roderick Macdonald, M.D., 330 E. Main St., Rock Hill, S. C.

Tennessee

TENNESSEE STATE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Alice Deutsch, M.D.
SECRETARY: William F. Murrah, Jr., M.D., 1720 Exchange Bldg., Memphis

CHATTANOOGA AND HAMILTON COUNTY EYE, EAR, NOSE AND THROAT SOCIETY

CHAIRMAN AND SECRETARY: J. E. Johnson, M.D., 4547 Brainerd Rd., Chattanooga 4
TIME AND PLACE: 6:30 p.m., Last Thursday of each month; Mountain City Club

KNOXVILLE SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: E. E. Miller, M.D.
SECRETARY: Reese Patterson, M.D., 406 West Church, Knoxville
TIME AND PLACE: Four times yearly; University of Tennessee Research Hospital

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

CHAIRMAN: Each member in alphabetical order
SECRETARY: William F. Murrah, M.D., 1720 Exchange Bldg., Memphis
TIME AND PLACE: Second Tuesday of each month; Memphis Eye, Ear, Nose and Throat Hospital

NASHVILLE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Clyde Alley, M.D.
SECRETARY: George Bounds, M.D., Medical Arts Bldg., Nashville, Tenn.
TIME AND PLACE: Third Monday, October through May; Caduceus Club, Mid State Medical Center

Texas

TEXAS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: D. Gatlin Mitchell, M.D.
SECRETARY: Oliver W. Suehs, M.D., 14 Medical Arts Square, Austin, Texas
TIME AND PLACE: December 2 and 3, 1961; Sheraton Hotel, Dallas

DALLAS ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: David S. Stayer, M.D.
SECRETARY-TREASURER: M. R. Harrington, M.D., 8215 Westchester, Dallas
TIME AND PLACE: First Tuesday of each month, Parkland Hospital

FORT WORTH EYE, EAR, NOSE AND THROAT SOCIETY

PRESIDENT: Jack Brownfield, M.D.
SECRETARY: Joe L. Bussey, M.D., 1201 W. Presidio, Fort Worth
TIME AND PLACE: First Friday of each month; St. Joseph Hospital

HOUSTON OPHTHALMOLOGICAL SOCIETY

PRESIDENT: Elizabeth Crawford, M.D.
SECRETARY: Donald P. Ford, M.D., Hermann Professional Bldg.
TIME AND PLACE: 8:00 p.m.; Third Thursday, September through June, Doctor's Club

SAN ANTONIO SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Graham B. Milburn, M.D.
SECRETARY: Thomas F. Hogan, Jr., M.D.
CORRESPONDING SECRETARY: J. L. Mims, Jr., M.D., 705 E. Houston St., San Antonio
TIME: Third Tuesday of each month; September through May

TEXAS OPHTHALMOLOGICAL ASSOCIATION

PRESIDENT: Jack B. Lee, M.D.
SECRETARY: Harold E. Hunt, M.D., 150 8th Street, Paris, Texas
TIME AND PLACE: May 13 and 14, 1962; Austin, Texas

Utah

UTAH OTO-OPHTHALMOLOGICAL SOCIETY

PRESIDENT: David Dolowitz, M.D.
SECRETARY: Don B. McAffee, M.D., 508 East South Temple, Salt Lake City
TIME AND PLACE: Third Monday of each month; University Club, Salt Lake City

Virginia

VIRGINIA SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Edgar Childrey, Jr., M.D.
SECRETARY-TREASURER: Marion K. Humphries, Jr., M.D., 104 E. Market St., Charlottesville
TIME AND PLACE: May 3-5, 1962; Norfolk

TIDEWATER OPHTHALMOLOGICAL AND OTOLARYNGOLOGICAL SOCIETY

PRESIDENT: A. D. Morgan, M.D.
SECRETARY: J. A. Klotz, Jr., M.D., 821 Wainwright Bldg., Norfolk 10
TIME AND PLACE: October, February and May; Tidewater area

RICHMOND, VIRGINIA, EYE, EAR, NOSE AND THROAT SOCIETY

PRESIDENT: John Gill, M.D.
SECRETARY: Mason Smith, M.D., 2035 Monument Ave., Richmond 20
TIME AND PLACE: Third Tuesday of January, March, May and October; Commonwealth Club

Washington

WASHINGTON STATE MEDICAL ASSOCIATION,
SECTION ON EYE, EAR, NOSE AND THROAT

PRESIDENT: Earl L. Barrett, M.D.
SECRETARY: Neil F. Thorlakson, M.D., 605 Cobb Bldg., Seattle 1

PUGET SOUND ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: John Shiach, M.D.
SECRETARY: Louis N. Hungerford, Jr., M.D., 1118 9th Avenue, Seattle 1
TIME AND PLACE: Third Tuesday of the month; October through May, Roosevelt Hotel, Seattle

SPOKANE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Andrew F. deRoetth, M.D.
SECRETARY: Phillip B. Greene, M.D., Old National Bank Bldg., Spokane
TIME AND PLACE: Quarterly, Last Tuesday of the month; Paulsen Medical Library

West Virginia

WEST VIRGINIA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

PRESIDENT: Albert C. Esposito, M.D.
SECRETARY-TREASURER: Worthy W. McKinney, M.D., Beckley, W. Va.
TIME AND PLACE: April 22-25, 1962; Greenbrier Hotel, White Sulphur Springs

Wisconsin

MADISON, WISCONSIN, EYE, EAR, NOSE AND THROAT SOCIETY

PRESIDENT: John V. Berger, Jr., M.D.
SECRETARY: John Doolittle, M.D., 110 East Main Street, Madison
TIME AND PLACE: 6:00 p.m., First Tuesday of each month, November thru May; Madison Club

MILWAUKEE OTO-OPHTHALMIC SOCIETY

PRESIDENT: George Roncke, M.D.
SECRETARY: Arvid Holm, M.D., 2040 West Wisconsin Avenue, Milwaukee
TIME AND PLACE: 6:30 p.m., Fourth Tuesday of each month, October through May; University Club

LISTING OF AUDIOMETERS

The following audiometers are recommended for listing by a subcommittee of the Committee on Conservation of Hearing, American Academy of Ophthalmology and Otolaryngology:

PURE TONE AUDIOMETERS

Beltone Model 10-C Model 15-C	Beltone Hearing Aid Company Audiometer Division 2900 West 36th Street Chicago 32, Illinois
Maico Model MA-5 Model H1-B for pure tones only	Maico Electronics Inc. Maico Building 21 North Third Street Minneapolis 1, Minnesota
Sonotone Model 91	Sonotone Corporation Elmsford, New York
Zenith ZA 200	Zenith Radio Corporation 6501 West Grand Avenue Chicago 35, Illinois

SPEECH AUDIOMETERS

Grayson-Stadler Model 162	Grayson-Stadler Co. West Concord, Massachusetts

SCREENING AUDIOMETERS

Ambco Otometer 600	Ambco Inc. 1222 W. Washington Blvd. Los Angeles 7, California

Each model number in the list as a rule indicates the most advanced model of that series. If less advanced instruments are for sale under similar model numbers, it is assumed that they will function as well or better than the more complicated model in a series.

Acceptance for listing means that the audiometer manufacturer has demonstrated the ability to produce one instrument that performs according to A.S.A. specification. It does not imply that any individual instrument will perform within the tolerances. It is obviously beyond the scope of the Listing Committee or the Referee Laboratories to provide production control for audiometer manufacturers and their customers; however, listing does indicate that the product of the manufacturer can come up to 1951 A.S.A. specifications, and it is up to the customer to carry on negotiation with the manufacturer if a particular instrument which he receives is faulty.

Abatron D-100 and Ambco Oto-chek 800 were removed from the above list at the request of the respective manufacturers.

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